

ABSTRACT

Title of Document: SELF-COMPASSION AND THE
EXPRESSIVE WRITING PARADIGM: A
STUDY OF THERAPEUTIC
EFFECTIVENESS FOR CHRONIC PAIN

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Education

Chronic pain represents a wide-spread and costly problem that is often not treated effectively with traditional biomedical approaches (Turk et al., 2011). The literature emphasizes the importance of using psychological interventions that encourage self-management of pain. This study tested the effectiveness of two brief, online writing interventions that can be used by chronic pain patients in a wide-spread and cost-effective way (Kerns et al., 2001). Writing interventions have been found to produce beneficial psychological and physical outcomes for those with pain (e.g., Frattaroli, 2006,). This study added to the literature by using positive variations of the expressive writing paradigm that focused on self-compassion and self-efficacy, and testing the moderator variable of pain catastrophizing. Ninety-three participants with chronic pain were recruited from chronic pain forums and completed the writing intervention. Participants were randomized to either self-compassion or self-efficacy

writing and wrote for 20 minutes once a week for three consecutive weeks.

Participants completed baseline and post-intervention measures of pain severity, illness intrusiveness, pain acceptance, pain catastrophizing, depression symptoms, life satisfaction, self-compassion, and chronic pain self-efficacy. Results indicate that participants in both writing conditions reported significantly less pain, less depression, and greater self-compassion after the writing. Moreover, participants reported feeling more positive after each writing session. One significant difference emerged between the two types of writing: participants in the self-compassion condition reported less intrusive pain, whereas those in the self-efficacy condition reported more intrusive pain after the writing. In conclusion, although both types of writing have beneficial effects on psychological and physical health for those with chronic pain, the self-compassion writing may be even more favorable than the self-efficacy writing.

SELF-COMPASSION AND THE EXPRESSIVE WRITING PARADIGM: A
STUDY OF THERAPEUTIC EFFECTIVENESS FOR CHRONIC PAIN

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Chapter 1: Introduction

The promotion of human strengths has always been a foundation of counseling psychology (Lopez & Edwards, 2008). Focusing on strengths can help individuals build positive qualities and prevent or mitigate the onset of mental illness and suffering (Seligman & Csikszentmihalyi, 2000). Moreover, this positive focus can benefit everyone and improve quality of life regardless of the degree of pathology. When Martin Seligman became president of the American Psychological Association in 1998, he made positive psychology his focus, calling for a movement to emphasize the empirical study of human strengths and positive emotional well-being as opposed to an exclusive focus on distress (Seligman, 2000). While counseling psychology has always focused on the positive side of psychology, Seligman's call led to a boom in positive psychological research.

As the positive psychology movement has progressed, researchers have begun to develop positive psychology interventions to increase well-being. These interventions involve a wide variety of activities and treatment methods, but most aim to cultivate positive feelings, behaviors or cognitions. A meta-analysis of 51 positive psychology interventions, that included positive writing, positive psychotherapy, and gratitude training, found that they significantly enhance well-being (average $r=.29$) and decrease depressive symptoms (average $r=.31$) as compared to control groups (Sin & Lyubomirsky, 2009). These findings demonstrate that positive psychology interventions are quite effective as indicated by medium effect sizes. While the positive interventions were more effective than control groups, they were also more effective than "treatment as usual," which included traditional psychotherapy, CBT,

and writing about trauma. Recently, researchers have begun to use the internet as a means to deliver sustainable positive psychology interventions to as many people as possible (Mitchell, Vella-brodrick, & Klein, 2010). Internet-based interventions not only increase access to psychological treatment, but they are more affordable and can help individuals overcome barriers related to stigma (Clay, 2012). The preliminary studies on the effectiveness of these online positive psychology interventions found that most improved well-being and reduced depressive symptoms (Mitchell et al., 2009; Seligman et al., 2005; Shapira & Mongrain, 2010). However, given the small number of studies conducted in this area, more research is necessary to conclusively establish their efficacy.

Self-compassion involves recognizing and being compassionate towards one's own suffering, inadequacies and failures, holding painful or distressing emotions in awareness and having a sense of shared humanity (Neff, 2003). Research has found that self-compassion is consistently associated with well-being and can be experimentally induced, making it a prime target for interventions (Adams & Leary, 2007; Barnard, & Curry, 2011; Leary et al., 2007; Neely et al., 2009; Neff et al., 2007; Neff & Vonk, 2009). Several preliminary self-compassion intervention studies have been conducted and have been found to increase self-compassion and improve well-being (Baker & McNulty, 2011; Gilbert & Proctor, 2006; Kelly, Zuroff, Foa, & Gilbert, 2010; Kelly et al., 2009; Leary et al., 2007; Shapira & Mongrain, 2010; Zabelina, 2010). While the interventions vary in terms of length, format and type of exercises, almost all have involved writing. To the author's knowledge, only one self-compassion intervention has been conducted online. The intervention involved

writing a letter of self-compassion everyday for a week and was found to reduce depression and increase happiness as compared to the control group (Shapira & Mongrain, 2010). Thus, writing interventions appear to be an effective means of increasing self-compassion, and online self-compassion interventions show promise. However, considering only one study has conducted an online self-compassion intervention, additional research is needed to verify the efficacy of this approach and to determine when and for whom this intervention is effective.

Self-efficacy represents a widely-studied construct which has been associated with successful performance of a given behavior and persistence in the face of obstacles (Bandura, Adams, & Beyer, 1977). One way that self-efficacy is increased is through performance-based accomplishments which highlight an individual's ability to succeed (Bandura, 1997). Research has found that writing about these personal mastery experiences and focusing on previous successes can enhance a person's self-efficacy (Fitzgerald & Schutte, 2010; Kirk, Schutte, and Hine, 2011; Shantz and Latham; 2012). While writing seems to be a promising intervention to increase self-efficacy, none of these studies have been conducted online. Therefore an online self-efficacy writing intervention would contribute to the literature and presents a novel way of reaching a wider audience.

A framework for using writing as a brief psychological intervention has been developed by Pennebaker in the form of the expressive writing paradigm (Pennebaker & Beall, 1986). The paradigm involves writing about emotional experiences to help participants explore thoughts and feelings around a stressful event (Pennebaker, 1997). Extensive research has found that expressive writing produces significant

improvements in reported health, psychological well-being, physiological functioning, and general functioning (Fratzeroli, 2008; Frisina et al., 2004 Smyth, 1998). However, immediately after writing about trauma, participants generally experience increased negative affect which can last for several weeks (Gillis et al., 2006; Smyth, 1998). Findings such as this have prompted researchers to develop positive variations of the traditional paradigm. In contrast to the traditional paradigm, positive writing interventions, such as writing about self-compassion, have been found to immediately increase positive affect and produce the same benefits several months later as writing about trauma (Burton & King, 2004; King, 2001). Thus interventions utilizing a positive writing condition may provide more immediate benefits as compared to the traditional expressive writing paradigm about trauma.

One of the criticisms of positive psychology is the lack of research on unhealthy samples (e.g., psychological distress, chronic health problems) as opposed to healthy samples (McNulty & Fincham, 2012). Several studies have found that the same processes that benefit individuals in optimal circumstances could harm those in suboptimal circumstances (e.g., Gibson & Sanbonmatsu, 2004; Gordon, Burton, & Porter, 2004; McNulty, 2010). Therefore, it is necessary to study individuals who are suffering in order to understand how positive psychology interventions could relieve suffering. In response to this criticism, positive psychology interventions have started to target populations experiencing distress, such as those with depression (Sin & Lyubomirsky, 2009). However, few positive psychology interventions have been extended to those with physical illnesses. Correlational research has explored concepts such as benefit-finding, optimism and sense of coherence in those with

medical conditions, such as cancer and heart disease (e.g., Aspinwall & Tedeschi, 2010). Yet only a limited number of studies have employed positive psychology interventions with these populations (Danoff-Burg, Agee, Romanoff, Kremer, and Strosberg, 2006; Mann, 2001; Stanton et al., 2002).

Chronic pain, defined as pain that occurs on most days of the month for at least six months, represents an area with a growing need for positive psychological interventions. Chronic pain has been increasing in prevalence along with the increasing age of the U.S. population (Institute of Medicine, 2011). WHO estimates that 37% of individuals worldwide suffer from chronic pain and more Americans suffer from chronic pain than from heart disease, cancer, and diabetes combined (Tsang et al., 2008). Moreover, the cost of chronic pain both from direct health-care costs and indirect costs, such as lost productivity and disability payments, exceeds \$210 billion annually in the US (National Research Council, 2001). Those affected often suffer from the loss of physical and emotional function, and reduced activity levels which can influence their ability to work and to maintain social relationships, and increased financial burden from health care bills or reduced income (Turk, Wilson, Cahana, 2011). Thus chronic pain affects all aspects of a person's life and the need for alleviation of symptoms is great. However, the treatment of chronic pain has been a difficult pursuit since the underlying mechanisms involve a complex interaction of physiological, emotional, cognitive, social, and environmental factors (Gatchel, Peng, Peters, Fuchs, & Turk, 2007). As such, counseling psychologists have an opportunity to employ their expertise in strength-based and positive psychology interventions in those with chronic pain (Chwalisz & Obasi, 2008).

Traditionally, chronic pain was treated using the biomedical model which focused on the physical processes of the condition without considering the social or psychological elements (Suls & A. Rothman, 2004). However, the inadequacy of this approach led to a shift away from a biomedical model to a biopsychosocial conceptualization of health and illness (Chwalisz & Obasi, 2008). This biopsychosocial perspective maintains that physical health and well-being are shaped by the interactions between biological, psychological, and social factors (Gatchel, 2005). Therefore, treating only the physical problems of chronic pain, without considering the psychological and social aspects, represents an incomplete and inadequate form of treatment (Gatchel et al., 2007). Pain in particular is viewed as a private, covert and subjective experience, which calls for an understanding of the psychological factors that impact pain (Kerns, Sellinger, & Goodin, 2011). In this respect, psychological interventions are a necessary part of treatment for chronic pain in order to address physical and emotional functioning as well as overall quality of life. Systematic reviews of psychological treatment for chronic pain have found improvement in pain and physical and emotional functioning, however, there is inadequate evidence that one therapeutic approach works better than another (Turk et al., 2011).

While self-compassion interventions have not been used with chronic pain populations, there are several reasons why this is a promising positive psychology intervention. First, research on emotions and chronic pain has found that problems in regulating and expressing emotions are associated with increased pain and distress (Burns, Johnson, Devine, Mahoney, & Pawl, 1998; Keefe, Lumley, Anderson, Lynch,

& Carson, 2001; Lumley, Asselin, & Norman, 1997). As a result, individuals suffering from chronic pain would likely benefit from psychological interventions that target emotion regulation. Self-compassion represents an emotion regulation strategy in that distressing emotions are held in awareness with kindness, understanding, and a shared sense of humanity, rather than avoided (Neff, 2003). Second, correlational research has found that higher levels of self-compassion in chronic pain patients is associated with higher positive affect, greater adaptive pain coping, higher pain acceptance, lower negative affect and less pain disability (Costa & Pinto-Gouveia, 2011; Wren et al., 2011). Thus, interventions that increase self-compassion could help improve the quality of life for those suffering from chronic pain.

Self-efficacy interventions also show promise for benefitting chronic pain populations. Higher chronic pain self-efficacy, which refers to the amount of confidence in coping with the consequences of chronic pain, has been associated with a number of positive outcomes, including lower pain severity, lower pain interference, lower pain catastrophizing; higher levels of general activity, and greater emotional well-being (Anderson, Dowds, Pelletz, Edwards, and Peeters-Asdourian, 1995; Arnstein, 2000; Hadjistavropoulos & Shymkiw, 2007; Sanchez, Martinez, Miro, & Medina, 2011; Thompson, Urmston, Oldham, & Woby, 2010; Valeberg et al., 2008). Individuals with higher pain self-efficacy also tend to use more active coping strategies (Turner, Ersek, & Kemp, 2005) and persevere in their efforts to reduce pain (Turk, 2002). Therefore, an intervention that increases individuals' self-

efficacy for managing their pain would likely benefit those suffering from chronic pain.

There has been a call within the positive psychology literature to tailor treatments to the individual based on relevant predictive characteristics (McNulty & Fincham, 2012). One potential moderator that may be important to explore for chronic pain includes pain catastrophizing. Pain catastrophizing involves the extent that one experiences an exaggerated negative orientation to actual or anticipated pain (Sullivan et al., 2001) and has been associated with pain severity and intensity (Osman et al., 2000). Research has also found that pain catastrophizing is negatively correlated with self-compassion (Wren et al., 2011) and self-efficacy (Shelby et al., 2008). Although this construct has not been tested as a moderator in self-compassion or self-efficacy intervention studies, it has been explored in the traditional expressive writing paradigm. These studies found that those higher in pain catastrophizing benefitted more from expressive writing as compared to those lower in pain catastrophizing (Norman, Lumley, Dooley, & Diamond, 2004; Sullivan & Neish, 1999). The role of pain catastrophizing as a potential moderator needs to be explored in positive writing studies.

The present study has four purposes: 1) To assess the effectiveness of a brief, online self-compassion and self-efficacy intervention for individuals with chronic pain, 2) To assess the effectiveness of the interventions on physical (e.g., pain severity, pain acceptance), emotional (e.g., depressive symptoms, life satisfaction), and behavioral (e.g., illness intrusiveness) outcomes, 3) To determine whether pain catastrophizing moderates the relationship between the interventions and the

outcomes, and 4) To compare a self-compassion intervention with a self-efficacy intervention. The first purpose of the study aligns with national recommendations to promote the self-management of pain (National Research Council, 2001) since the online nature of the intervention allows for self-directed and convenient use. Moreover, discovering psychosocial interventions that can be easily combined with other pain treatments will provide more comprehensive care that addresses the multidimensional impact of pain. In addition, the use of positive psychology interventions for chronic medical illnesses represents a relatively unexplored area. Chronic pain serves as the focus of this study as opposed to specific conditions since chronic pain is a widespread phenomenon and often the underlying conditions of chronic pain are poorly understood or undiagnosed. Moreover, pain may not be a symptom that all individuals with a specific disease or condition experience. Therefore, it makes more sense to operationalize the perceived level of pain that an individual is experiencing rather than the specific disease or condition that causes varying levels of pain. The second purpose of the study is based in part on recommendations by the Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials (IMMPACT) to include outcome variables of physical, emotional, and behavioral functioning in clinical trials of chronic pain treatments (Dworkin et al., 2005; Turk et al., 2003). Many treatment studies continue to use pain severity as the primary outcome measure, but ignore these other important outcomes, such as pain acceptance (Turk et al., 2011). The third purpose of the study addresses the call within the positive psychology and expressive writing literature to determine for whom the intervention is most effective (McNulty & Fincham, 2012; Pennebaker,

2004). This is accomplished by exploring whether pain catastrophizing moderates the effectiveness of the self-compassion or the self-efficacy intervention on physical, emotional, and behavioral outcomes. The fourth purpose of the study improves upon previous research which normally compares the treatment writing intervention to a control group that writes about irrelevant topics (e.g., describing their daily schedule). Writing about trivial topics lacks face validity and risks creating a negative response (Norman et al., 2004). In contrast, this study compares the self-compassion condition with a relevant alternative treatment condition of writing about self-efficacy in dealing with chronic pain. Given the limited research on self-compassion and physical health, this study further delineates the effect of self-compassion on chronic pain which hopefully will promote additional research on the topic.

Chapter 2: Review of the Literature

Chronic pain refers to pain that extends beyond the expected period of healing and represents a highly prevalent and costly problem. Those affected often suffer from the loss of physical and emotional function, reduced activity levels which can influence their ability to work and to maintain social relationships, and increased financial burden from health care bills or reduced income (Turk et al., 2011). Thus chronic pain may affect all aspects of a person's life and the need for reduction or alleviation of symptoms is great. Given psychological, emotional, and social consequences of chronic pain, interdisciplinary treatments that include psychological interventions have been found to be the most effective (Flor, Fydrich, & Turk, 1992). Psychological interventions have the potential to target many different areas, however, emotion regulation represents a particularly promising area since those with chronic pain often have problems regulating and expressing emotions (Burns et al., 1998; Keefe et al., 2001; Lumley et al., 1997). One self-regulation strategy that has been gaining momentum is self-compassion. Self-compassion represents an emotion regulation strategy in that painful or distressing emotions are not avoided but held in awareness with kindness, understanding and a sense of shared humanity (Neff, 2003). Studies have found that writing in a self-compassionate manner is an effective medium for increasing self-compassion, subjective well-being and happiness (Baker & McNulty, 2011; Leary et al., 2007; Zabelina & Robinson, 2010), however, this type of intervention has not been tested in those with chronic pain. In addition to regulating emotions, the chronic pain literature has also highlighted the important role

that self-efficacy plays in developing successful pain management and coping strategies (Anderson et al., 1995; Arnstein, 2000; Valeberg et al., 2008). Previous research has utilized writing exercises based on personal mastery experiences to help increase self-efficacy (Fitzgerald & Schutte, 2010; Kirk, Schutte, and Hine, 2011; Shantz and Latham; 2012), however, these methods have not been used with chronic pain populations. Therefore, the current study utilized a variation of the expressive writing paradigm to test the effectiveness of a self-compassion and a self-efficacy intervention on emotional and physical functioning in those suffering from chronic pain.

This literature review will be divided into four main sections which will address the research on chronic pain, the theory and research related to self-compassion, the theory and research related to self-efficacy, and the research on the expressive writing paradigm. In the first section on chronic pain, I will briefly describe the characteristics of chronic pain, including cost and prevalence. Next, I will explore research on the comorbidity between chronic pain and psychological disorders as well as the influence of pain on mood. Finally, I will discuss the different treatment options for chronic pain, with a specific focus on psychological interventions, and review treatment outcomes, including pain acceptance and physical functioning.

In the second section, I will review and summarize the theory and research related to self-compassion, a positive psychology construct that has been gaining increased attention from researchers. Next, I will describe several preliminary self-compassion interventions that have been used in the research. Finally, I will present

the limited research that has been conducted on the association between self-compassion and chronic pain, along with a description of how self-compassion interventions could benefit those with chronic pain. In the third section, I will review and summarize the theory and research related to self-efficacy. Next, I will describe self-efficacy interventions that have utilized writing and personal mastery experiences. Finally, I will present research on the association between self-efficacy and chronic pain. In the fourth section, I will review and critique the literature on the expressive writing paradigm. First, I will present general meta-analyses regarding the effectiveness of the expressive writing paradigm as an intervention. Then, I will describe evidence from studies that have used the expressive writing paradigm with chronic pain. Finally, I will explore the research on moderators within the expressive writing paradigm that are pertinent to this study, including positive variations of the paradigm and pain catastrophizing.

Chronic Pain

Description

Pain is the most common reason that people seek medical attention (Loeser & Melzack, 1999). When pain lasts longer than six months, or beyond the expected period of healing, and impairs or disrupts normal bodily functioning, it is typically defined as chronic pain (Turk & Okifuji, 2009). Musculoskeletal pain, such as joint and back pain, represents the most common type of chronic pain, although most who suffer from chronic pain have multiple sites of pain (Croft, Blyth, & van der Windt, 2010). There are several common sources of chronic pain, including an underlying medical condition or disease, an injury, medical treatment, inflammation, and

neuropathic pain resulting from a disease of the nervous system (Institute of Medicine, 2011). Underlying medical conditions can include diseases such as fibromyalgia, and cancer, and the pain may become worse as the disease progresses. Injuries can also cause pain even after the original injury has healed, such as with the phantom limb phenomenon. Medical treatments, such as surgery, may evolve from acute pain to chronic pain, especially if nerve damage occurred during the procedure. Inflammation involves the damage of tissue, and in conditions such as rheumatoid arthritis, the pain persists as long as the tissue remains inflamed. Finally, neuropathic pain can result when an individual's nerves, spinal cord or brain is damaged, as in the case of a stroke (Costigan, Scholz, & Woolf, 2009). Aside from the known sources of chronic pain, there can be unknown causes of pain and in these instances, chronic pain can become a disease in and of itself (Institute of Medicine, 2011).

The prevalence of chronic pain is exceedingly high, with the World Health Organization estimating that 37% of individuals worldwide suffer from chronic pain (Gureje, Korff, Simon, & Gater, 1998). Moreover, in the U.S., more Americans suffer from chronic pain than from heart disease, cancer, and diabetes combined (Tsang et al., 2008). The percentage of people with chronic pain has been found to increase with age, where individuals 66 years of age and older in developed countries are twice as likely (prevalence=55%) to have been diagnosed with chronic pain as compared to those ages 18 to 35 (prevalence=25%) (Tsang et al., 2008). While the high prevalence rate is concerning, even more alarming is evidence that pain rates are increasing and likely to continue rising (Institute of Medicine, 2011). The reasons

behind the increasing prevalence rates point to an aging U.S. and increasing prevalence of obesity, both of which are associated with chronic pain conditions.

Not only is chronic pain highly prevalent, but it has large social and economic costs, both for the individual and society. Economic costs include direct health-care costs as well as indirect costs, such as lost productivity and disability payments. It is estimated that these costs combined produce an economic burden exceeding \$210 billion annually in the US (National Research Council, 2001). Individuals are also greatly affected since they often suffer from the loss of physical and emotional function, which reduces activity levels and can negatively influence relationships. Reduced activity levels can limit an individual's ability to work which presents a financial burden, especially in light of the high health care bills associated with chronic pain (Institute of Medicine, 2011). Moreover, chronic pain may limit social and recreational activities, which can create difficulties in maintaining social relationships (Turk et al., 2011). Family life may be greatly altered, especially since family members often take the role of caregiver, which can add strain to family relationships. Given the burdens associated with chronic pain, individuals struggling with this disease often experience serious psychological consequences.

Psychological Sequelae

Several studies have explored the prevalence of psychological disorders in individuals suffering from chronic pain. A literature review by Blair, Robinson, Katon, and Kroenke (2003) analyzed 14 studies that examined pain symptoms in those with depression and 42 studies that assessed for depression in those with chronic pain. Results indicate that the average prevalence of major depression in chronic pain patients ranges from 18% in population-based settings and 27% in primary care

clinics, to 52% in pain clinics or inpatient pain programs. The variation in prevalence rates is likely due to differences in study design, sample characteristics, diagnostic criteria for depression, and pain conditions examined within the study. However, the overall results indicate that the prevalence of concurrent depression and pain is often higher than the prevalence of each condition alone. There appears to be a reciprocal relationship between depression and pain, where increasing pain severity and impairment is associated with more depressive symptoms, and the presence of depressive symptoms is associated with more pain complaints, greater pain intensity, and greater impairment. However, in most patients with both pain and psychiatric conditions, the pain came first (Fishbain, Johnson, Webster, Greene, & Faysal, 2010). Depression combined with pain has been found to create additive impairments in all realms of a person's life, including social function, work function, and activities of daily living (Blair et al., 2003). Thus, chronic pain patients with comorbid depression experience an increased number of medical visits and higher health care costs. Moreover, when pain and depression coexist, the treatment of depression is often overlooked in favor of medically treating the pain symptoms. Treating pain and depression simultaneously seems necessary for improving quality of life in those with chronic pain.

Findings from the National Comorbidity Survey support the results from Blair et al.'s (2003) literature review. In a sample representative of the general US population, positive associations were found between chronic pain and mood (Odds Ratio=2.78, $p<.001$) and anxiety disorders (Odds Ratio=2.86, $p<.001$) (McWilliams, Cox, & Enns, 2003). The high comorbidity of these conditions occurs not only in the

United States, but in other countries around the world. Tsang et al. (2008) explored the prevalence of chronic pain and its association with depressive and anxiety disorders in ten developed and seven developing countries that participated in the World Mental Health Survey. Although the majority of those with chronic pain did not meet diagnostic criteria for depressive or anxiety disorders, the proportion of individuals with depression/anxiety spectrum disorders and chronic pain was greater than the proportion of those without pain in both developed (with pain=16.3%, without pain=8.2%) and developing countries (with pain=13.8%, without pain=5.1%).

Chronic pain and anxiety share many of the same symptoms, including worry, rumination, heightened physiological arousal, and increased physical tension (Geisser, Cano, & Foran, 2006). A study on patients with chronic lower back pain found that 25% met criteria for a current anxiety disorder which is significantly higher than the prevalence rates of 0.5% to 8.8% in the general population (Kinney, Gatchel, Polatin, Fogarty, & Mayer, 1993). Moreover, many of the same symptoms are observed in chronic pain as in PTSD, such as hyperarousal, hypervigilance, avoidance behavior, emotional lability, and heightened focus on somatic symptoms (Asmundson, Coons, Taylor, & Katz, 2002; Eccleston, Crombez, Aldrich, & Stannard, 1997; McNally & Amir, 1996; Snider, Asmundson, & Wiese, 2000; Vlaeyen & Linton, 2000). Research has found a higher prevalence of PTSD symptoms in chronic pain patients as compared to the general population. Prevalence rates for PTSD have ranged from 34.7% in those with chronic musculoskeletal pain (Asmundson, Norton, Allardings, Norton, & Larsen, 1998) to 50% in those who

experienced chronic pain from motor-vehicle accidents (Taylor & Koch, 1995). These rates are much higher than the 8% prevalent rate of PTSD in the general population (Amundson et al., 2002). Finally, data from the National Comorbidity Study indicate that patients with musculoskeletal pain are 4 times more likely to develop PTSD than are those without musculoskeletal pain (Cox & McWilliams, 2002). While it remains clear that chronic pain and anxiety disorders, such as PTSD, often co-occur, the nature of the relationship remains unknown (Arguelles et al., 2006). Nonetheless, the high co-morbidity indicates that assessing for symptoms such as hyperarousal, avoidance and intrusion, represents an important step in treating those with chronic pain.

Beyond psychological disorders, research has found that individuals with chronic pain generally experience more negative mood states, including anger-hostility, depression-dejection, fatigue-inertia and tension-anxiety, and less positive mood states than healthy individuals (Shuchang et al., 2011). Moreover, mood, and particularly anger, may have a reciprocal relationship with pain. Induced anger has been found to produce greater muscle tension in individuals with chronic lower back pain, and this tension was correlated with everyday pain severity (Burns, 2006). The association between mood and pain may be partly due to difficulties in regulating emotions. Research on emotions and chronic pain has found that problems in regulating and expressing emotions are associated with increased pain and distress (Burns et al., 1998; Keefe et al., 2001; Lumley et al., 1997). Thus, mood plays an important role in the experience of chronic pain, and treatments that focus on emotion regulation as well as alleviating pain may improve mood and produce better

outcomes. Unfortunately, chronic pain is often not treated effectively and typically focuses on medical approaches, such as medication or surgery, instead of psychological interventions (Turk et al., 2011).

Treatment

In response to the great need for effective chronic pain treatments, a growing array of treatment options are available, including medication, regional anesthetic interventions, surgery, psychological therapies, rehabilitative therapy, and, and complementary and alternative medicine. In particular, the use of medication to treat chronic pain has grown rapidly in the past decade (Martin et al., 2008). The most commonly prescribed and also the most controversial type of medication includes opioids, which have been found to have questionable efficacy, adverse side-effects, and the risk of misuse (Chou, Ballantyne, Fanciullo, Fine, & Miaskowski, 2009). A meta-analysis on the effectiveness of opioids for the treatment of chronic pain found that on average opioids produced only small improvements in pain severity and functioning as compared to the placebo (Furlan, Sandoval, Mailis-Gagnon, & Tunks, 2006). Moreover, another study on long-term opioid use in chronic pain patients found that as many as 45% could be misusing the drug (Michna et al., 2007).

Surgery represents another commonly used treatment for chronic pain, especially after other efforts have failed (Turk et al., 2011). Types of surgery include disc replacement, spinal fusion and joint replacement. A literature review evaluating the efficacy of surgery for back pain found that surgery produced significant pain reduction as compared to the non-surgical group (Chou, Baisden, Carragee, Resnick, Shaffer, & Loeser, 2009). However, another study found that as many as 41% of

chronic pain patients who had lumbar fusion surgery reported no change or a worsening quality of life up to 4.5 years after the surgery (DeBerard, Masters, Colledge, Schleusener, & Schlegel, 2001). Thus, despite the wide range of options, the overall effectiveness of pain treatments remains inconsistent and fairly poor. In a review of the literature, Turk et al. (2011) found that out of all treatment modalities, the best outcomes involved reducing pain by 30% in approximately half of the patients. Moreover, the reduction in pain did not necessarily lead to improved function. These findings suggest that the most commonly prescribed treatments for chronic pain are not sufficient on their own to eliminate pain and improve physical and emotional function.

Part of the difficulty in treating chronic pain is the complex interaction of physiological, emotional, cognitive, social, and environmental factors underlying the disease (Gatchel et al., 2007). Evidence indicates that chronic pain is not simply a physical problem, but a phenomenon that involves social and psychological dimensions as well (e.g., Hayes & Duckworth, 2006). One psychological dimension involves individual's perceptions of pain which has been found to depend on their subjective experience rather than "objective" measures (e.g., Crowley-Matoka, Saha, Dobscha, & Burgess, 2009; Resnik, Rehm, & Minard, 2001). For instance, back function and general physical fitness (e.g., muscle strength) have not been found to correlate with back pain (Bigos et al., 1991). Moreover, herniated disks are just as common in those with back pain as it is in those who do not report back pain (Boos et al., 1995). As a result, treatment of chronic pain has begun to incorporate a more integrative, multidimensional approach that emphasizes a biopsychosocial

framework, as opposed to a unidimensional and biomedical model (Gatchel et al. 2007). The biopsychosocial framework targets multiple dimensions of the chronic pain experience, such as disease management, pain reduction, improved functioning, emotional well-being and health-related quality of life (Institute of Medicine, 2011). Psychological interventions have become a common and necessary component of this interdisciplinary approach to treating pain. A meta-analysis of 65 studies found that multidisciplinary treatments that included psychological interventions were superior to individual treatments, such as medical or physical therapy (Flor et al., 1992).

Psychological treatments may include cognitive-behavioral treatment (CBT), behavioral treatment, self-regulatory interventions (e.g., biofeedback, relaxation training, hypnosis, mindfulness), and acceptance and commitment interventions. A large body of research has supported the effectiveness of these therapies on chronic pain (Kerns et al., 2011). Hoffman, Papas, Chatkoff, and Kerns (2007) conducted a meta-analysis to evaluate the efficacy of psychological interventions for adults with noncancerous chronic low back pain (CLBP). Twenty-two randomized clinical trials were included and results indicate that across all studies and outcomes, psychological treatments (whether alone or as part of multidisciplinary treatment) produced a small, but significant effect ($d=.16$). Specifically, when compared to controls, psychological treatments significantly reduced pain intensity ($d=.41$), and pain interference ($d=.23$), and improved health-related quality of life ($d=.41$). Moreover, when comparing types of psychological interventions, self-regulatory training (e.g., biofeedback, relaxation training) proved more effective at reducing depression as compared to CBT. Finally, multidisciplinary programs that included psychological interventions were superior to

other active treatment conditions (e.g., treatment as usual, physiotherapy, attention control) at improving work-related outcomes, such as returning to work. Thus, research has found evidence that psychological treatments improve pain, and physical and emotional functioning (Turk et al., 2011).

As the results of the meta-analysis indicate, determining the effectiveness of treatments involves assessing more than just the impact on pain severity and intensity. Measuring pain intensity alone does not adequately capture the nature of an individual's pain experience (Fishman, Ballantyne, & Rathmell, 2009). For instance, research has demonstrated that there is only a modest relationship between pain intensity and physical functioning (Turk, 2002), which suggests that clinical trials should also include measures of functioning to determine the extent to which pain interferes with activities of daily living, work, and other aspects of daily life. Moreover, many treatments are not effective at completely eliminating pain, and as a result there has been a movement to direct treatment efforts away from pain reduction and toward pain management and adjustment (Brena & Sanders, 1992; Hazard, 1994; McCracken, 1998).

One measure of pain adjustment that has used increasingly in treatment studies includes pain acceptance. The rationale behind pain acceptance is that attempting to avoid or control pain can be unhelpful and actually exacerbate pain, whereas accepting pain and directing efforts towards achievable goals can lead to better pain adjustment (McCracken, Gross, Sorg, & Edmands, 1993; McCracken, Vowles, & Eccleston, 2004; McCracken, Zayfert, & Gross, 1992). Pain acceptance involves accepting what cannot be changed, reducing unsuccessful attempts at

eliminating pain, and engaging in valued activities despite pain (McCracken, 1998; Wright et al., 2011). Greater acceptance of pain has been associated with a number of positive psychological and physical outcomes, including engagement in normal life activities (Viane et al., 2003), less medication consumption (McCracken & Eccleston, 2005), lower pain intensity, less pain-related anxiety and avoidance, less depression, less physical and psychosocial disability, and better work status (McCracken, 1998; Vowles, McCracken, & O'Brien, 2011). Moreover, greater pain acceptance predicts lower psychological distress and less pain disability, even after controlling for optimism, demographic, and medical variables (Wright et al., 2011). However, research has found low correlations between acceptance of pain and pain intensity, which indicates that acceptance is not simply a function of having a lower level of pain (McCracken, 1998; McCracken & Eccleston, 2005; Wright et al., 2011). Instead, accepting pain involves experiencing less distress from pain and feeling less disabled by pain (McCracken, Vowles, & Eccleston, 2005). In support of this viewpoint, greater acceptance of pain has predicted better adjustment on physical and psychosocial functioning, independent of perceived pain intensity (McCracken, 1998). Thus, treatments that can enhance pain acceptance may be considered effective even if pain intensity is not reduced.

Psychological treatments are well-suited to increase pain acceptance and one therapy method that has been developed for a variety of clinical disorders, including chronic pain, is acceptance and commitment therapy (ACT; Hayes Strosahl, & Wilson, 1999). ACT employs the techniques of mindfulness in observing thoughts and feelings as they occur without trying to change them, and emphasizes behaving in

ways consistent with valued goals and life directions (Kerns et al., 2011). There has been some evidence that the mindfulness techniques used in ACT produce greater tolerance of pain than do more traditional techniques of pain control, such as those used in CBT (Gutierrez, Luciano, Rodriguez, & Fink, 2004; Levitt, Brown, Orsillo, & Barlow, 2004). Thus, there appears to be a need to develop psychological treatments that teach acceptance and mindfulness. ACT and many of the psychological treatments involve psychologist-delivered interventions, such as therapy. However, these treatments are limited in that individuals may not have access to such interventions, especially if mobility is a concern. Moreover, individuals who live with chronic pain must engage in self-management of pain (e.g., self-assurance strategies, relaxation), which takes place outside of a health care setting, in order to engage in daily activities (Institute of Medicine, 2011). As a result, there is a great need for psychological interventions that involve wide-spread, cost-effective dissemination that promote easy access for those with chronic pain (Kerns et al., 2001). One promising method includes the use of self-directed and individualized internet-based interventions. The current study explored the effectiveness of a self-directed, internet-based writing intervention that could be widely distributed and easily incorporated into a multidisciplinary treatment approach. A self-compassion intervention that incorporates acceptance-based strategies was compared to a self-efficacy intervention that focuses more on control-based strategies. Whereas self-efficacy is a widely researched area, the concept of self-compassion is a new area of research that has been gaining increased attention as an emotion regulation strategy.

Self-Compassion

Defining the Construct

Self-compassion is defined as being open to and moved by one's own suffering, experiencing caring and kindness towards oneself, taking an understanding and nonjudgmental approach towards one's inadequacies and failures, and recognizing that one's own experience is part of the common human experience (Neff, 2003). Neff (2003) conceptualized self-compassion as being composed of three basic components: 1) self-kindness, 2) common humanity and 3) mindfulness. Self-kindness involves extending kindness to oneself rather than harsh judgment or self-criticism. This is particularly important when confronting suffering, inadequacy or difficult life circumstances. Common humanity involves seeing one's experiences as part of the larger human experience as opposed to seeing them as separating and isolating. This process includes the recognition that being imperfect, making mistakes, and encountering life difficulties is part of something that everyone experiences. Finally, mindfulness involves facing personal weaknesses and life challenges with clarity of feeling, with the ability to repair emotional states and without emotional overreactions. This includes having the right amount of distance from one's emotions so that they are fully experienced, but approached with mindful objectivity.

Although these components are conceptually distinct, they also interact in a way that mutually enhances one another (Neff, 2003). For instance, mindfulness is needed in order to let in feelings of self-kindness and common humanity even when contemplating one's negative experiences. However, mindfulness also plays a more

direct role in these components. Taking a detached stance naturally lessens self-criticism and increases self-understanding, which leads to greater self-kindness (Jopling, 2000). Mindfulness also involves balanced perspective-taking which can counter feelings of isolation and increase feelings of interconnectedness, or common humanity (Elkind, 1967). In addition, self-kindness and common humanity can further increase mindfulness. Experiencing self-acceptance and realizing that suffering and personal failure happen to everyone helps reduce the negative impact of the emotional experience and makes it easier to balance one's thoughts and feelings. Finally, feelings of common humanity and self-kindness enhance each other as well. Self-kindness tends to decrease feelings of self-consciousness which in turn enhances interconnectedness (Fromm, 1963). Moreover, realizing that everyone experiences suffering and personal failures reduces the amount of blame placed on oneself and increases feelings of kindness toward those in pain, including oneself (Rubin, 1975).

Self-compassion represents a construct that is distinct from self-pity, self-indulgence and self-esteem (Neff, 2004). With self-pity, a person becomes absorbed by his or her own problems, forgetting that other people experience similar problems. In contrast, self-compassion involves experiencing common humanity or an increased sense of connection with others. Self-compassion also remains distinct from self-indulgence which is associated with excessive gratification of desires and lack of discipline. Some may worry that experiencing compassion for the self is equivalent to self-indulgence, however, self-compassion is associated with personal initiative to make needed changes in one's life and therefore motivates people to create health and well-being for themselves (Neff et al., 2007). Finally, self-compassion and self-

esteem share some similarities, yet there are key differences between these constructs. Self-compassion and self-esteem both represent positive self-attitudes and as such are moderately correlated with each other (Leary et al., 2007; Neff, 2003). However, self-esteem involves evaluations of self-worth and often entails comparisons with others and the need to be above average (Neff, 2011). As a result, self-esteem has been found to relate to narcissism, self-absorption and lack of concern for others (Baumeister, Boden, & Smart, 1996). Self-compassion, on the other hand, is not based on self-evaluation or comparison to others, but on a kind, connected and clear-sighted relationship with the self, even in instances of failure (Neff, 2004). As such, self-compassion is not linked to narcissism or prejudice (Neff, 2003) and may provide similar mental health benefits as self-esteem, but without the downsides (Neff, 2011).

Research supports the psychological benefits of self-compassion, as evidenced by its relationship with markers of psychological well-being. Neff (2003) developed the Self-Compassion Scale (SCS), which has been found to positively correlate with life satisfaction ($r=.45$), positive affect ($r=.34$), happiness ($r=.57$), optimism ($r=.62$), social connectedness ($r=.41$), emotional intelligence ($r=.43$ to $.55$), reflective wisdom ($r=.61$), mastery goals ($r=.28$) (as opposed to performance goals), and extroversion ($r=.32$) (Kirkpatrick, 2005; Neff, 2003; Neff, Hsieh, & Dejitterat, 2005; Neff et al., 2007). Moreover, the SCS has been found to negatively correlate with negative affect ($r=-.36$), self-criticism ($r=-.65$), depression ($r=-.51$), rumination ($r=-.40$), anxiety ($r=-.66$), thought suppression ($r=-.55$), neuroticism ($r=-.65$), shame proneness ($r=-.32$), social physique anxiety ($r=-.37$), objectified body consciousness ($r=-.54$), fear of failure ($r=-.51$), and fear of negative evaluation ($r=-.48$) (Mosewich, Kowalski,

Sabiston, Sedgwick, & Tracy, 2011; Neff, 2003; Neff et al., 2005; Neff et al., 2007). Self-compassion appears to enhance not only individual well-being, but relationship well-being as well. For women, self-compassion was found to be positively associated with relationship satisfaction and motivation to correct interpersonal mistakes (Baker & McNulty, 2011). This same association was found for men as well, but only with those who were high in conscientiousness. The common humanity aspect of self-compassion, which involves a more interconnected and less separate view of the self, is further illustrated in findings from a writing exercise. Self-compassion negatively correlated with the use of singular pronouns such as “I” ($r=-.21$) and positively correlated with the use of plural pronouns such as “we” ($r=.23$) and with social references such friends, family, communication ($r=.21$) (Neff et al., 2007).

While it is clear from the research that there is a positive relationship between self-compassion and psychological well-being, researchers are beginning to explore the mechanism behind this connection. One explanation is that self-compassion functions as an emotion regulation strategy. Emotion regulation involves paying attention to one’s emotions, managing the intensity of emotions and changing the meaning of emotions in stressful situations (Thompson, 1994). As such, emotion regulation has been found to relate to positive psychological adjustment (Stanton, Kirk, Cameron, & Danoff-Burg, 2000). Self-compassion represents an emotion regulation strategy in that painful or distressing emotions are not avoided but held in awareness with kindness, understanding and a sense of shared humanity (Neff, 2003). This process allows individuals to more clearly evaluate the immediate situation and

determine his or her actions, which in turn leads to better functioning. It would seem then that self-compassion would be a promising target for an intervention. While it has mostly been studied as a trait-like, dispositional variable in correlational designs, several studies have found that self-compassion can be experimentally induced and also increased over time.

Interventions

The self-compassion interventions within the literature have varied in terms of length, format and type of exercises. Several studies have employed brief one-time writing interventions lasting approximately 10 minutes, where participants respond to prompts for self-kindness, common humanity and mindfulness (e.g., list ways that other people experience similar events; Baker & McNulty, 2011; Leary et al., 2007; Zabelina & Robinson, 2010). Randomized controlled trials found that responding to these prompts increases levels of self-compassion as compared to writing about other things (e.g. self-esteem, goal-setting, emotional expression). Moreover, those who wrote about self-compassion took more responsibility for their actions and had lower negative affect than participants who wrote about self-esteem, emotional disclosure, or nothing at all (Leary et al., 2007). Men high in conscientiousness who wrote about self-compassion were more motivated to correct interpersonal mistakes than those who wrote about self-criticalness (Baker & McNulty, 2011). In addition, the self-compassion writing exercise facilitated creativity for individuals high in self-criticism (Zabelina & Robinson, 2010). The conclusion from these findings is that even a brief intervention can promote positive changes, although some individuals are more likely to benefit from self-compassion writing than others.

More extensive interventions have also been conducted. Compassionate mind training (CMT) was developed to increase self-compassion among people with chronic psychological problems who have high shame and self-criticism (Gilbert & Procter, 2006). CMT incorporates multiple techniques, such as imagery, memories, letter-writing, diary entries and self-talk to elicit empathy for one's own distress and enhance self-soothing. In a pilot study of CMT, six participants with chronic mental health difficulties attended 12 two-hour sessions and experienced significant reductions in depression, anxiety, self-criticism, shame, inferiority and submissive behavior, and significant increases in their ability to self-soothe (Gilbert & Procter, 2006). Kelly et al. (2009) found that two weeks of daily exercises based on CMT (e.g., letter writing, imagery and self-talk) reduced shame and skin complaints among distressed acne sufferers as compared to a control condition. Moreover, a similar three-week CMT regimen reduced daily smoking in participants seeking to quit as compared to the control group (Kelly et al., 2010). Participants with high self-criticism and low readiness to change were more likely to respond to the self-compassion intervention (self-criticism and intervention interaction: $r=.26$, medium effect). In another study, an internet sample wrote a letter of self-compassion everyday for a week and experienced significant decreases in depression after 3 months ($\eta^2=.04$, medium effect) and significant increases in happiness after 6 months ($\eta^2=.05$, medium effect) as compared to the control group (Shapira & Mongrain, 2010). Thus, writing interventions, in addition to other exercises, appear to be an effective means of increasing self-compassion and producing other positive effects.

Relationship with Chronic Pain

Self-compassion interventions have been successfully conducted with participants who suffer from chronic mental health problems, however, to this author's knowledge, these interventions have not been applied to those suffering from chronic pain. There is reason to believe that increasing self-compassion could benefit chronic pain patients. One study found that chronic pain patients who had higher levels of self-compassion had greater acceptance of their pain (Costa & Pinto-Gouveia, 2011). Acceptance of pain refers to acknowledging the existence of pain, relinquishing unproductive attempts to control pain, and attempting to live a satisfying life despite pain (McCracken, 1998). This corresponds to the conceptualization of self-compassion which includes accepting and acknowledging one's own pain and holding emotions in mindful awareness (Neff, 2003). Previous research has found that acceptance of pain is an important predictor of adjustment to chronic pain (McCracken, 1998; McCracken, Spertus, Janeck, Sinclair, & Wetzel, 1999). Another study found that individuals with chronic musculoskeletal pain who reported higher levels of self-compassion had lower levels of negative affect, pain catastrophizing, and pain disability, and higher levels of positive affect and pain self-efficacy (Wren et al., 2011). This suggests that self-compassion is associated with better psychological functioning, more adaptive pain coping and lower levels of pain disability. Thus, self-compassion in the face of persistent pain may enable individuals to be more mindful and accepting of their day-to-day limitations, while still maintaining engagement in meaningful activities.

Although research has not directly tested self-compassion interventions in a chronic pain population, controlled studies of mindfulness-based and meditation-based interventions, which include aspects of self-compassion (e.g., increasing awareness and acceptance), have shown positive results in terms of pain management. In one study, a loving kindness-based meditation intervention that included elements of self-compassion reduced pain, anger and psychological distress among patients with persistent low back pain (Carson et al., 2005). Self-compassion fits in well with the recent shift in cognitive behavioral therapies that emphasize contextual methods, including acceptance and mindfulness, instead of controlling or changing psychological experiences (Hayes, 2004). Attempts to avoid or control pain have not led to significant or lasting reduction in pain (McCracken, 1998). Self-compassion could serve as a useful emotion regulation strategy where feelings of pain are not avoided, but instead held in awareness with kindness, understanding and a shared sense of humanity (Costa & Pinto-Gouveia, 2011).

In this study, self-efficacy serves as a comparison intervention and focuses on personal agency and control in managing pain rather than acceptance. Self-compassion and self-efficacy for chronic pain share some similarities and research has found a positive association between these two constructs ($r=0.25$; Wren et al., 2011). However, whereas self-compassion tends to focus on acceptance of pain, self-efficacy focuses more on competence in the area of managing pain.

Self-Efficacy

Defining the Construct

Self-efficacy refers to an individual's belief in his or her ability to successfully perform a behavior that will produce a certain outcome (Bandura, 1977). This involves exercising personal control over performing certain actions (Bandura, 1997). Self-efficacy tends to be domain-specific, where a person may have high self-efficacy in one area, but low self-efficacy in another (Bandura, 1997). Moreover, self-efficacy beliefs affect whether individuals will initiate a behavior as well as maintain it over time. For instance, an individual who does not feel capable of enacting a certain behavior or handling a certain situation will likely avoid these activities. Those with stronger perceived self-efficacy will be more likely to engage in the activities they feel confident about and will also be more persistent in the face of obstacles. Self-efficacy also predicts successful performance for a given behavior, where the higher an individual's self-efficacy, the greater the probability of success (Bandura, Adams, & Beyer, 1977).

Bandura (1977) theorized that people develop their self-efficacy beliefs based on four sources of information: performance-based accomplishments, vicarious experiences of others' success, verbal persuasion, and emotional arousal. For the purposes of this study, this review will focus on performance accomplishments since this is the most applicable source of information used in the writing intervention. Performance accomplishments involve personal mastery experiences and are especially effective at influencing perceived self-efficacy (Bandura, 1997). Personal mastery experiences provide the most authentic evidence of an individual's ability to

succeed and have been found to produce stronger efficacy beliefs than the other sources of information including vicarious experiences, cognitive simulations or verbal instruction (Gist, 1989; Gist, Schwoerer, & Rosen, 1989). For instance, if an individual experiences successes in enacting a behavior, this will strengthen their self-efficacy and their expectations for succeeding at this activity in the future. Self-monitoring of one's performance can play a large role in the development of self-efficacy (Bandura, 1997). Individuals who selectively attend to and remember their poorer performances are more likely to have lower self-efficacy and underestimate their abilities. On the other hand, when a person focuses more often on and remembers their successes, this can enhance self-efficacy. Therefore, techniques to enhance mastery experiences through selective attention should be powerful tools to enhance self-efficacy.

Interventions

There has been a multitude of research on techniques to enhance self-efficacy. This review will focus on interventions to enhance self-efficacy that are related to self-monitoring of performance and are relevant to the writing intervention used in this study. One technique that has been used to help individuals self-monitor their performance is after-event reviews in which individuals analyze their decisions, behaviors, and evaluate their contribution to performance outcomes (Busby, 1999; Ellis & Davidi, 2005). These reviews allow the person to reflect on their performance and determine what they can learn from their past experiences and how they can use this information to improve future performance (Baird, Holland, & Deacon, 1999). Research indicates that after-event reviews increase self-efficacy ($f^2=.17$, medium

effect) and improve performance ($f^2=.10$, medium effect) (Ellis, Ganzach, Castle, & Sekely, 2010; Ellis, Mendel, & Nir, 2006; Ron, Lipshitz, & Popper, 2006). Moreover, self-efficacy mediates this relationship, where after-event reviews increase self-efficacy, and this increase in self-efficacy improves performance (Ellis et al., 2010). These reviews increase self-efficacy by helping individuals make sense of their past behavior, empowering them to appraise their performance, and therefore feel greater mastery over their behavior (Ellis et al., 2010).

Often, after-event reviews are conducted with a supervisor or instructor, however, research has also found that self-directed written reviews of performance also enhance self-efficacy. Written self-guidance has been used in training environments where individuals write a self-affirming letter to themselves explaining the most effective skills and techniques they intended to use to be successful in achieving a certain outcome (Shantz & Latham, 2012). These letters are meant to remind individuals of techniques that are the most important to them in a self-affirming, positive way. Shantz and Latham (2012) found that writing a self-affirming letter for 20 minutes about interview performance increased self-efficacy ($d=1.11$, large effect) and improved performance ($d=.56$, medium effect), as compared to the control condition. Moreover, self-efficacy mediated the relationship between the written self-guidance and interview performance. A content analysis of the written self-guidance revealed that self-affirming statements and self-relevant statements were positively associated with interview performance ($r=.51$ and $r=.57$, respectively). This suggests the importance of writing positive messages that contain specific information and examples relevant to the individual.

Other writing interventions have specifically focused on writing about self-efficacy in a certain area or domain. These writing interventions were based on the expressive writing paradigm and involved writing for 20 minutes a day for three days during the week. Fitzgerald and Schutte (2010) used a self-efficacy writing intervention to increase self-efficacy for transformational leadership. Participants were asked to draw on their past experiences and write about their thoughts and feelings related to their leadership behavior as well as focus on the behaviors that led to personal leadership success. Results indicate that the self-efficacy writing intervention increased self-efficacy for transformational leadership ($\eta^2=.61$, large effect) and increased transformational leadership behaviors ($\eta^2=.14$, large effect) as compared to the neutral writing control condition.

Similarly, Kirk et al. (2011) employed a self-efficacy writing intervention to increase emotional intelligence in the workplace. Participants were asked to build their confidence in their ability to perceive and manage emotions by reflecting on their feelings and thoughts related to their workday. Specifically, the intervention tapped into personal mastery experiences by asking participants to reflect on how they effectively perceived, used, understood, and regulated emotions in themselves and others in the workplace. Results indicate that the self-efficacy writing intervention increased emotional self-efficacy, but only for participants who had low or moderate initial levels of self-efficacy ($\eta^2=.21$, large effect). Moreover, the self-efficacy condition increased emotional intelligence ($\eta^2=.31$, large effect) and reduced workplace incivility perpetration ($\eta^2=.12$, large effect) as compared to the neutral writing control condition.

These findings suggest that writing about personal mastery experiences may be a particularly effective means of increasing self-efficacy. Bandura (1997) reports that changing self-efficacy beliefs involve attending to and interpreting sources of self-efficacy, such as mastery experiences. Writing may facilitate the cognitive processes of attending and interpreting by allowing participants to restructure their thought processes and focus on the actions that lead to positive outcomes (Fitzgerald & Schutte, 2010). Research has found that participants benefit the most from expressive writing when it allows them to make sense of an event, gain insight, and organize and integrate information about their previous experiences (Pennebaker 1993; Pennebaker, 2004). Moreover, written disclosures about one's previous experiences can be thought of as a mastery experience in itself as it allows individuals to observe themselves and their previous actions (Lepore, Greenberg, Bruno, & Smyth, 2002). Especially when individuals write about their previous successes, they may feel that their stressors or challenges are more controllable and this may give them a new or stronger sense of self-efficacy.

Chronic Pain Self-Efficacy

Self-efficacy tends to be domain-specific, therefore, it is important to consider the research on self-efficacy as it relates to chronic pain. Anderson et al. (1995) developed the Chronic Pain Self-Efficacy Scale (CPSS) to measure individual's perceived self-efficacy to cope with the consequences of chronic pain. The measure includes subscales for pain management, coping with symptoms, and physical function. Self-efficacy for pain management includes items that relate to reducing and managing pain (e.g., How certain are you that you can decrease your pain quite a

bit?). Self-efficacy for coping with symptoms refers to regulating activities and emotions (e.g., How certain are you that you can control your fatigue?). Finally, self-efficacy for physical function refers to the ability to engage in daily activities (e.g., How certain are you that you can shop for groceries or clothes?).

Higher chronic pain self-efficacy has been associated with a number of positive health outcomes, including less severe pain, less interference in their daily lives due to pain, lower levels of disability, and higher levels of general activity (Anderson et al., 1995; Arnstein, 2000; Sanchez et al., 2011; Thompson et al., 2010; Valeberg et al., 2008). Functional self-efficacy in particular has been found to be a strong predictor of pain intensity and disability (Woby, Roach, Urmston, & Watson, 2007). Moreover, chronic pain self-efficacy has also been associated with emotional well-being, where those higher in self-efficacy report a more positive mood, fewer symptoms of depression, less hopelessness, and less negative affect (Anderson et al., 1995; Arnstein, 2000; Sanchez et al., 2011; Thompson et al., 2010; Valeberg et al., 2008). Finally, higher chronic pain self-efficacy has been associated with cognitive variables including greater perceived life control, lower pain catastrophizing ($r = -.59$), and readiness to self-manage pain (Hadjistavropoulos & Shymkiw, 2007; Lumley, Smith, & Longo, 2002).

In terms of actual behavior, studies have found a positive association between chronic pain self-efficacy and active coping strategies (e.g., task persistence, exercise), but not with passive coping strategies (e.g., resting, asking for assistance) (Turner et al., 2005). This corresponds to findings in the literature that higher self-efficacy predicts more active and tenacious coping efforts (Bandura, 1997). It is likely

that individuals who believe they can alleviate their suffering are more apt to be active in employing strategies to reduce their pain (Turk, 2002). Individuals who have higher self-efficacy are also more likely to persevere in their efforts and are less likely to be hindered when confronted with the challenge of pain (Turk, 2002). However, if individuals doubt their ability to control their pain, they will likely stop their attempts to use active coping strategies if they do not experience immediate positive results.

Based on the positive associations between chronic pain self-efficacy and indices of well-being, interventions to increase chronic pain self-efficacy would likely lead to a number of positive physical, emotional, cognitive, and behavioral outcomes. Previous treatment studies have found that pain management and educational interventions increase self-efficacy for chronic pain (Lefort, 2000; Lorig, Ritter, Laurent, & Plant, 2006; Mangels, Schwarz, Worringen, Holme, & Rief, 2009). However, to this author's knowledge there have not been any interventions that have focused specifically on chronic pain self-efficacy. As indicated above, writing about personal mastery experiences holds promise as a way to increase chronic pain self-efficacy and lead to positive outcomes. Individuals will likely need to perceive a high level of control and ability of manage their pain in order to benefit from a personal mastery intervention. The role of moderators in influencing the efficacy of the interventions will be discussed below.

Both the self-compassion and the self-efficacy interventions described above incorporated writing. Expressive writing that helps participants explore thoughts and feelings around a stressful event has been found to produce therapeutic effects (Pennebaker, 1997). In the next section, I will review the literature on expressive

writing, discuss how it relates to chronic pain, describe the findings on moderators of expressive writing, and discuss positive variations on the traditional expressive writing paradigm.

Expressive Writing Paradigm

As therapy has demonstrated, the act of disclosure can be a powerful therapeutic agent that helps the individual acknowledge and make sense of distressing experiences (Pennebaker, 1997). Pennebaker developed the expressive writing paradigm to explore the effects of writing about emotional experiences, with the idea that written disclosure will have psychological and physical benefits (Pennebaker & Beall, 1986). Over the course of several decades, multiple studies have demonstrated the effectiveness of the expressive writing paradigm and the findings suggest that it is a cost-effective way of improving multiple facets of people's lives (Frattaroli, 2006).

Meta-Analyses

Several meta-analyses have been conducted to explore whether the expressive writing intervention works, how well it works, for whom it works, and when it works. Smyth (1998) conducted the first meta-analysis on 13 experimental studies, most of which used samples of healthy college students. The results indicate that there was a small mean effect size ($r = .23$) across all studies and outcomes. Moreover, the written emotional expression task led to significant improvement on reported health, psychological well-being, physiological functioning, and general functioning as compared to the control group. Frisina et al. (2004) conducted another meta-analysis to explore the effects of expressive writing on the health outcomes for psychiatric or

physical disorders. Of the nine experimental studies that were included, five focused on medical illnesses including renal cancer, breast cancer, prostate cancer, asthma, and rheumatoid arthritis. The mean weighted effect size across all studies and outcomes was smaller ($r = .10$) than Smyth (1998), but still significant. Of note, the expressive writing paradigm demonstrated a significantly greater impact on physical health outcomes ($d = .21$; e.g., health care utilization, somatic symptoms) as compared to psychological health outcomes ($d = .07$; e.g., positive and negative affect).

While the meta-analyses by Smyth (1998) and Frisina et al. (2004) provide evidence that expressive writing produces positive and significant effects, these studies have several limitations. First, both meta-analyses used a fixed effects approach to determine the significance of the overall mean effect size. This is an appropriate method for analyzing a small number of studies, however, it limits the generalizability of the findings since the results and conclusions cannot be extrapolated to participants in studies not included in the analysis (Hedges, 1994). In contrast, a random effects approach allows researchers to generalize the findings to similar studies not included in the analysis since the study is the unit of analysis, instead of the participant (Raudenbush, 1994). This method is appropriate for analyzing a large number of studies and increases the scope of generalizability. The second limitation of the previous meta-analyses is that they did not include many of the current studies on the expressive writing paradigm. The number of experimental disclosure studies has grown in recent years and the methodology has changed to include different types of disclosures and different writing instructions.

In response to these limitations, Frattaroli (2006) conducted a meta-analysis using a random effects approach on a larger number of studies that included a more inclusive definition of experimental disclosure. As a result of including a large number of studies, this meta-analysis was also able to test new moderators that were not included in previous analyses. Frattaroli (2006) included 146 experimental studies and found a small, but significant mean weighted effect size ($r = .08$) across outcomes. Although the effect size was small for expressive writing, findings indicate that this intervention produces beneficial outcomes and could lead to positive changes. In terms of psychological health, Frattaroli (2006) found that expressive writing significantly reduced distress, depression, anger, and anxiety, and significantly increased positive functioning. In terms of physiological functioning, expressive writing significantly improved immune parameters, but did not improve any of the other types of functioning (e.g., joint condition, strength). For reported health, expressive writing significantly improved specific disease outcomes (e.g., HIV symptoms) and illness behaviors (e.g., medication use). For general functioning, expressive writing significantly improved work-related outcomes (e.g., absenteeism), social relationships (e.g., forgiveness) and cognitive functioning (e.g., working memory). Finally, participants who completed expressive writing felt significantly more positive about the intervention and attempted to process/make sense of event significantly more often than the control group.

Frattaroli (2006) also explored multiple moderator variables, including setting, participant, methodological and treatment variables. These analyses revealed the conditions under which the expressive writing paradigm had the largest effect.

Specifically, studies that included only participants with physical health problems, paid participants, and had participants disclose at home or in a private setting had larger effect sizes. Moreover, having at least three disclosure sessions that lasted at least 15 min, asking participants to write about more recent events, giving participants direct questions or specific examples of what to disclose, and having a follow-up periods of less than 1 month led to larger effect sizes. When only looking at the studies that administered the expressive writing under these optimal conditions, the average effect size was $r = .20$ (small-medium effect). Conversely, some variables did not have an effect on the outcome of expressive writing, including participant age, participant ethnicity, participant education level, spacing of disclosure sessions, valence of disclosure topic, and mode of disclosure (hand writing, typing, or talking).

The meta-analyses provide a broad overview of the effectiveness of the expressive writing paradigm and provide guidelines regarding the optimal conditions under which to administer the intervention. However, given the wide variation in types of participants, outcome variables and methodological differences across studies, it remains difficult to draw conclusions about the effectiveness of expressive writing with a chronic pain population. Therefore, the next section will specifically explore studies that used expressive writing with participants who have medical conditions involving chronic pain.

Use with Chronic Pain

Multiple studies have explored the effect of expressive writing on pain for a number of different medical conditions. Specifically, expressive writing has been used with participants who have the following medical conditions: chronic pelvic

pain, cancer, fibromyalgia, and rheumatoid arthritis (e.g., Gillis et al., 2006; Lumley et al., 2011; Rosenberg et al., 2002). To the author's knowledge, Norman, Lumley, Dooley, & Diamond (2004) conducted the only study to explore expressive writing in a population specifically characterized by chronic pain. They focused on women with chronic pelvic pain and found that expressive writing reduced pain intensity two months later ($\eta^2=0.13$, large effect) as compared to controls (Norman et al., 2004). Aside from this study, research has also used the expressive writing paradigm with those who have conditions marked by chronic pain. Pain represents a common symptom of cancer and research has found that the expressive writing paradigm is effective at reducing the perception of pain in cancer patients. Rosenberg et al., (2002) found a medium effect size (Cohen's $d=.57$) for expressive writing on pain perception in those with prostate cancer. Moreover, Cepeda et al. (2008) researched expressive writing in participants with different types of cancer and found that those who had more emotional disclosures reported significantly less pain as compared to those whose narratives were less emotional.

Research on expressive writing has also focused on diseases with symptoms of chronic pain, such as fibromyalgia and rheumatoid arthritis. Fibromyalgia represents a medical condition that involves widespread musculoskeletal pain. One study on fibromyalgia found that expressive writing reduced pain (Cohen's $d= 0.45$, medium effect) and enhanced psychological well-being (Cohen's $d = 0.54$, medium effect) four months later as compared to the control group (Broderick, Junghaenel, & Schwartz, 2005). However, Gillis et al. (2006) found that expressive writing reduced the global impact of fibromyalgia, but did not affect pain perception specifically.

Mixed results have also been found in research on rheumatoid arthritis, a disease characterized by joint pain. Some studies on rheumatoid arthritis have found that expressive writing reduces pain perception (Lumley et al., 2011), especially for those with low trait anxiety (Danoff-Burg et al., 2006). However, other studies have found that expressive writing did not improve pain perception, but did improve physical functioning, affect (Kelley, Lumley, & Leisen, 1997) and physiological changes (van Middendorp, Geenen, Sorbi, van Doornen, & Bijlsma, 2009).

Overall, there has been relatively little research on the effectiveness of expressive writing in those with chronic pain. The research that has been conducted indicates inconsistent findings regarding the extent that expressive writing reduces the perception of pain. Although the intervention may not always reduce pain, there is some evidence that it may be beneficial in other ways, such as improving psychological well-being. Given the mixed findings, it will be important to continue researching the effect of expressive writing in chronic pain and explore potential moderators which might account for the variability in results.

Positive Writing Interventions and Moderators

Pennebaker (2004) called for future research to determine when and for whom the expressive paradigm is most effective. In line with this recommendation, studies have begun to explore individual differences that may moderate the relationship between expressive writing and psychological and physical outcomes. Research indicates that expressive writing may not benefit some personality types, such as those who are higher on alexithymia (i.e. lack of insight into feelings, symptoms, and psychological processes) (Lumley, 2004). Moreover, variations of the expressive

writing paradigm appear to benefit some individuals more than others (Danoff-Burg et al., 2006). This suggests that interventions need to be tailored for individual differences so that participants can optimally benefit from expressive writing.

Recently, studies have begun to develop variations of the traditional expressive writing paradigm to include a more positive approach. Whereas the traditional paradigm asks participants to disclose their thoughts and feelings about a traumatic event, new variations ask participants to write about the benefits of traumatic events (King & Miner, 2000) or write about their “best possible self” (King, 2001). These positive writing interventions have been found to be just as beneficial as the traditional expressive writing in terms of health benefits (Cameron & Nicholls, 1998), including reducing illness-related doctor’s visits (King, 2001; King & Miner, 2000). Moreover, these positive writing interventions may produce additional benefits not found in the traditional paradigm. For instance, immediately after writing about trauma, participants generally experience increased negative affect which can last for several weeks (Gillis et al., 2006; Smyth, 1998). In contrast, positive writing interventions have been found to immediately increase positive affect (Burton & King, 2004; King, 2001). In one study, writing about the best possible self (i.e., writing about one’s life as if all one’s goals were met and everything went right) improved psychological wellbeing, whereas writing about trauma did not (King, 2001). Thus interventions utilizing a positive writing condition may provide more immediate benefits as compared to the traditional expressive writing paradigm about trauma, and invoking painful emotions may not be necessary in order to obtain psychological and physical benefits.

Preliminary research suggests that the type of writing intervention (e.g. traditional expressive writing vs. positive writing) may interact with individual differences, such that one type of writing is better for some individuals, whereas another type of writing is better for others. Danoff-Burg et al. (2006) explored trait anxiety as a possible moderator between expressive writing and health outcomes for participants with rheumatoid arthritis or lupus. In addition, this study examined the effect of two different types of expressive writing exercises: the traditional paradigm (i.e., write thoughts and feelings about their disease), and benefit-finding (i.e., write about any positive thoughts and feelings about their disease). Results indicate that participants in the traditional expressive writing group and the benefit-finding group had less fatigue three months later as compared to controls. Interestingly, an interaction occurred where benefit-finding reduced pain levels for those with high trait anxiety, whereas traditional expressive writing reduced pain levels for those with low trait anxiety. This suggests that for individuals with high trait anxiety, a positively focused writing intervention may be experienced as less distressing and lead to more beneficial outcomes than emotional disclosure.

These findings correspond with other research on moderators in positively-focused writing interventions for individuals with medical conditions. Mann (2001) explored the potential moderator of optimism in HIV-infected women. Participants were assigned to either write about a positive future or a no-writing control condition. Results indicate that the positive future writing intervention was effective in reducing distress from medication side effects, but only for those low in optimism. In fact, the intervention had the opposite effect for those high in optimism, where it increased

distress from side effects. This suggests the importance of tailoring interventions to the individual since harmful effects can occur. Cameron and Nicholls (1998) also explored optimism as a moderator in college students assigned to self-regulation writing (i.e. plans to cope with the transition to college), expressive writing, or neutral writing. They found that only the self-regulation writing improved mood and college adjustment for those low in optimism, whereas both self-regulation and expressive writing benefitted those high in optimism.

Finally, Stanton et al. (2002) explored the moderator of avoidance in women with breast cancer who were assigned to one of three writing conditions: emotional disclosure, benefit-finding, or control. Results indicate that those who were high in avoidance benefitted more from benefit-finding as compared to expressive writing, whereas the opposite was true for those low in avoidance. Thus, positive writing interventions appear to be effective for those with medical conditions, however, individual characteristics play an important role in determining who will benefit the most from these interventions.

The current study will explore pain catastrophizing as a potential moderator of the relationship between health outcomes and type of writing intervention. Pain catastrophizing involves having an exaggerated negative orientation to actual or anticipated pain (Sullivan et al., 2001). Studies on chronic pain patients have found that higher pain catastrophizing is associated with greater pain severity, higher pain intensity, greater negative affect, and reduced positive affect (Osman et al., 2000). Discovering effective interventions for those high in pain catastrophizing represents an important endeavor since often pain catastrophizing predicts poor treatment

outcomes for chronic pain (Sullivan, 2012). For instance, high levels of pain catastrophizing led to poor outcomes for pharmacological (Mankovsky, Lynch, Clark, Sawynok, & Sullivan, in press), surgical (Sullivan, Tanzer, et al., 2009), physical (Wideman & Sullivan, 2011a) and psychological interventions (Sullivan et al., 2005) for pain conditions.

However, a self-compassion writing intervention may be particularly effective for those high in pain catastrophizing for several reasons. First, self-compassion has been found to negatively correlate with pain catastrophizing (Wren et al., 2011). Second, pain catastrophizing has been conceptualized as a maladaptive coping strategy aimed at communicating pain and distress to others as a means of eliciting attention and concern (Sullivan, 2012). Increasing self-compassion through an intervention may help those who report higher pain catastrophizing feel that their pain is part of a common human experience and feel a greater sense of social connectedness (Wren et al., 2011). Moreover, research suggests that interventions that are empathic, validating and involve disclosure, all of which are elements of the self-compassion intervention, may be particularly effective (Cano, Barterian, & Heller, 2008; Linton, Boersma, Vangronsveld, & Fruzzetti, in press; Thorn, Ward, Sullivan, & Boothy, 2003). Third, mindfulness, which represents one of the components of self-compassion, has been negatively associated with pain catastrophizing in chronic pain samples (Cassidy, Atherton, Robertson, Walsh, & Gillett, 2012; Schutze, Rees, Preece, & Shutze, 2010).

While those high in pain catastrophizing may particularly benefit from a self-compassion intervention, it is unknown how they may respond to a self-efficacy

intervention. Pain catastrophizing has been negatively associated with pain self-efficacy (Shelby et al., 2008). However, writing about personal mastery experiences as a way to enhance self-efficacy for coping with pain may present particular challenges for those high in pain catastrophizing. In order for individuals to benefit from this type of intervention, they would need to perceive that they have had mastery experiences in managing their pain and believe that they have a certain level of control in these instances. Yet, individuals who are high in pain catastrophizing tend to feel a high level of helplessness and lack of control over coping with pain (Sullivan et al., 2001). Moreover, research has suggested that catastrophic thinking involves excessive focus on pain sensations (Eccleston et al., 1997) and a self-efficacy intervention that focuses on pain management strategies may only contribute to rumination about pain symptoms. However, given the lack of research in this area, it remains unknown how pain catastrophizing may affect participants' response to the intervention. Although pain catastrophizing has not been tested as a moderator in self-compassion or self-efficacy intervention studies, it has been explored in the traditional expressive writing paradigm. These studies found that those higher in pain catastrophizing benefitted more from expressive writing as compared to those lower in pain catastrophizing ($f^2=.10$, small-medium effect, Norman, Lumley, Dooley, & Diamond, 2004; Sullivan & Neish, 1999). The research has called for more exploration regarding the critical elements of effective treatments for those high in pain catastrophizing (Sullivan et al., 2001).

In summary, the expressive writing paradigm represents a brief, cost-effective, “mass-oriented” intervention that is often enjoyed by participants and which produces

psychological and physical benefits (Frattaroli, 2006). Although expressive writing typically produces small effects, it may serve as a catalyst for change and result in cascading effects. Moreover, combining expressive writing with therapy or traditional medical care may reduce the cost and length of treatment given beneficial outcomes of this intervention. Yet, as Lumley, Smith, and Longo (2002) suggested, some individuals may not be ready to disclose personally traumatic information and may need a less threatening way of exploring their feelings. Thus examining individual differences that may moderate the effectiveness of the intervention and identifying new variations of the expressive writing paradigm that may be less threatening represent important endeavors. The self-compassion and self-efficacy writing interventions fit well the movement toward positive expressive writing and represent interventions that may be less threatening for some individuals. Moreover, pain catastrophizing has been largely unexplored as a potential moderator and is theoretically linked to self-compassion. A self-compassion expressive writing intervention may be particularly beneficial for those suffering from chronic pain since it emphasizes acceptance and understanding of pain, rather than attempts to avoid or control pain which have not been found to significantly reduce pain (McCracken, 1998). By comparing a self-compassion intervention to a self-efficacy intervention, this study seeks to determine the effect of each type of treatment on the psychological and physical well-being of those suffering from chronic pain.

Chapter 3: Statement of the Problem

Chronic pain represents a wide-spread and costly problem that is growing in prevalence (Institute of Medicine, 2011; National Research Council, 2001; Tsang et al., 2008). While many different conditions and diseases can cause chronic pain, it can also be a condition in and of itself (Institute of Medicine, 2011). Chronic pain is often not treated effectively, especially when using the traditional biomedical approach which does not consider social and psychological elements (Suls & A. Rothman, 2004; Turk et al., 2011). Approaches that incorporate multiple modalities, including psychological interventions, have been found to be more effective (Flor et al., 1992; Hoffman et al., 2007). This study combines positive psychology and expressive writing to test new psychological interventions that focus on self-compassion and self-efficacy writing. A self-compassion intervention may be particularly effective for chronic pain since increased pain is associated with difficulties regulating emotions (Burns et al., 1998; Keefe et al., 2001; Lumley et al., 1997) and self-compassion represents an emotion regulation strategy (Neff, 2003). A self-efficacy intervention may also be effective for chronic pain patients, but perhaps in a different way. This type of intervention could help participants increase their ability to manage and cope with their pain by focusing on personal mastery experiences.

Individual characteristics may partially determine who benefits from which type of writing intervention. Pain catastrophizing has been found to predict treatment outcomes for chronic pain patients (Sullivan, 2012) and was included in this study as a potential moderator of intervention effectiveness. Those higher in pain

catastrophizing may benefit more from the self-compassion intervention since research suggests that pain catastrophizing represents a maladaptive coping strategy. A self-compassion intervention that fosters empathy, validation and the acceptance of emotions may help those who are high in pain catastrophizing cope with their pain in more effective ways (Cano et al., 2008; Linton et al., in press; Thorn et al., 2003). Since the self-efficacy intervention focuses on personal mastery experiences, those high in pain catastrophizing may have fewer positive experiences to draw upon and therefore not benefit as much from this type of intervention.

This study randomly assigned individuals with chronic pain into two different writing conditions: self-compassion writing and self-efficacy writing. The focus of the study was on chronic pain rather than specific conditions or diseases since chronic pain represents a widespread symptom that can be operationalized. Specific diseases and conditions may be more difficult to operationalize and pain may not be a symptom that all individuals with a specific disease or condition experience. Participants completed three writing sessions of 20 minutes over the course of three weeks. Psychological and physical outcomes were assessed and pain catastrophizing was included as a potential moderator.

This study was designed to address several of the key limitations of previous research and to advance knowledge within the domains of health psychology, positive psychology, and expressive writing. Positive psychological research has called for the examination of positive constructs within unhealthy populations, such as those with chronic diseases (McNulty & Fincham, 2012). In addition, there has been a movement towards using more technology-based interventions to provide easier

access, and reach a wider number of people in a cost-effective way (Clay, 2012; Kerns et al., 2001). This study advances knowledge in these areas by exploring the effectiveness of self-compassion and self-efficacy writing interventions on those with chronic pain. Moreover, positive psychology and the expressive writing literature has called for more research on when and for whom the brief interventions are most effective (McNulty & Fincham, 2012; Pennebaker, 2004). In response, this study tested the potential moderator of pain catastrophizing on positive variations of the expressive writing paradigm. Finally, the literature on chronic pain has emphasized the lack of effective treatments for chronic pain (Turk et al., 2011). Since a biopsychosocial perspective that incorporates psychological interventions has shown promise (Flor et al., 1992; Institute of Medicine, 2011), this study tested the effectiveness of a brief intervention that can be combined with other treatment methods for chronic pain. Based on gaps in the literature and important factors that still require exploration, this study examined the following hypotheses and research questions in individuals with chronic pain. Aside from the manipulation check, research questions were posed instead of hypotheses since the lack of research, especially comparing a self-efficacy versus a self-compassion intervention, made it difficult to predict the outcome of the analyses.

Manipulation Check

Research Question 1: Is there evidence that the manipulation (i.e., the two writing conditions) worked?

Hypothesis 1a: Participants in the self-compassion condition will report higher self-compassion at follow-up as compared to participants in the self-efficacy

condition.

Several studies have used brief, one-time writing interventions that compare writing about self-compassion versus writing about other topics (e.g. self-esteem, goal-setting, emotional expression). In each of these studies, the self-compassion writing condition increased self-compassion as compared to the other writing conditions (Baker & McNulty, 2011; Leary et al., 2007; Zabelina & Robinson, 2010). More extensive self-compassion interventions have also been used, however, these studies either did not specifically test whether the intervention influenced levels of self-compassion or did not use randomized controlled trials (Gilbert & Procter, 2006; Kelly et al., 2010; Kelly et al., 2009). Self-compassion writing interventions have not been tested with a chronic pain sample, but since even brief writing interventions have increased self-compassion, it would be expected that in this study writing over three time periods would lead to greater levels of self-compassion as compared to the self-efficacy condition.

Hypothesis 1b: Participants in the self-efficacy condition will report higher chronic pain self-efficacy at follow-up as compared to participants in the self-compassion condition.

Several studies have used writing as a way to increase self-efficacy by having participants write about self-efficacy and personal mastery in a certain area. Results indicate that these interventions increased self-efficacy in the area that participants were writing about (Fitzgerald & Schutte, 2010; Kirk et al., 2011; Shantz & Latham, 2012). Although writing self-efficacy interventions have not been used with chronic

pain samples, it is expected that this type of intervention would increase self-efficacy for chronic pain.

Hypothesis 1c: An independent rater's categorization of writing conditions will demonstrate adequate agreement with the actual writing condition categorization.

Participants were given specific instructions regarding writing either in a self-compassionate way or writing in a way to increase self-efficacy (e.g., focusing on personal mastery experiences). Participants in the self-compassion condition were instructed to write about their chronic pain in a kind, understanding, accepting non-self-critical way. Participants in the self-efficacy condition were instructed to write about their chronic pain in terms of how they have learned to handle their pain and pain management strategies they plan to use in the future. Therefore, if participants followed the instructions, the content of their writing would differ for the two conditions. We hypothesized that an independent rater would be able to distinguish which condition participants were assigned to based on the content of their writing.

Hypothesis 1d: Participants in the self-compassion condition will display greater use of first-person plural pronouns as compared to those in the self-efficacy condition.

Hypothesis 1e: Participants in the self-compassion condition will display fewer first-person singular pronouns as compared to those in the self-efficacy condition.

Pennebaker and other researchers who study writing interventions have begun to explore the word content of participants' writing samples as a manipulation check (Pennebaker & King, 1999). Specifically, words relating to pronoun use have often

been explored and studies have found linguistic differences between expressive writing and neutral writing interventions (Burton & King, 2004). One would expect to find linguistic differences between the self-compassion and self-efficacy writing conditions since participants are asked to write about chronic pain in different ways. In other words, the content of the essays should be consistent with the goals of the intervention.

Specifically for a self-compassion writing condition, one of the goals is to promote a more interconnected view of the self. Thus one would expect that the self-compassion writing intervention would include more first-person plural pronouns (i.e., we, us) words as compared to the self-efficacy writing condition. Although most of the self-compassion writing studies have not explored the content of the essays, research has found a positive association between levels of self-compassion and use of first-person plural pronouns (Neff et al., 2007). Moreover, self-compassion has been negatively associated with first-person singular pronouns (i.e., I) (Neff et al., 2007). Self-efficacy writing studies have not explored pronoun use in essay content, however, since individuals are writing about their personal mastery experiences, it would be expected that they would use more first-person singular pronouns.

General Analytic Strategy

Research Question 2: Will participants report improvements in their physical well-being at follow-up?

Research Question 2a: Will participants in both the self-compassion and self-efficacy conditions report an increase in the Chronic Pain Acceptance Questionnaire - Pain Willingness subscale?

Research Question 2b: Will participants in both the self-compassion and self-efficacy conditions report an increase in the Chronic Pain Acceptance Questionnaire - Activity Engagement subscale?

Activity engagement and pain willingness represent two components of pain acceptance. Activity engagement refers to the degree of engagement in life activities regardless of pain and pain willingness refers to the degree of willingness to experience pain without attempts to control it (McCracken et al., 2004). Previous self-compassion and self-efficacy interventions have not been conducted with chronic pain samples and therefore research has not explored the effect of these types of interventions on pain acceptance. However, correlational studies have found that chronic pain patients with higher levels of self-compassion had higher pain willingness and activity engagement (Costa & Pinto-Gouveia, 2011). Similarly, higher chronic pain self-efficacy has also been associated with higher pain willingness and activity engagement (Nicholas & Asghari, 2006). This suggests that both the self-compassion and the self-efficacy interventions may increase these two aspects of chronic pain acceptance.

Research Question 2c: Will participants in both the self-compassion and self-efficacy conditions report a decrease in illness intrusiveness?

Illness intrusiveness refers to the extent to which a disease or treatment interfere with various life domains (e.g., health, diet, work, etc.; Devins et al., 1983). To this author's knowledge, research has not explored the association between illness intrusiveness and self-compassion or self-efficacy. However, there are constructs similar to illness intrusiveness, such as pain interference and pain disability, which

measure the extent that pain inhibits functioning within various life domains. Studies have found that higher pain self-efficacy is associated with lower pain-related interference in general (Hadjistavropoulos, Dash, Hadjistavropoulos, & Sullivan, 2007) and specifically in social activities (Park & Sonty, 2010). Moreover, higher self-compassion has been found to be a significant predictor of lower levels of pain disability (Wren et al., 2011). Although research in this area is very limited, the preliminary findings suggest that illness intrusiveness may decrease as a result of both the self-compassion and the self-efficacy interventions.

Research Question 2d: Will participants in both the self-compassion and self-efficacy conditions report a decrease in pain severity?

Research has found that chronic pain self-efficacy is associated with pain severity. Specifically, higher chronic pain self-efficacy was associated with lower pain severity ($r = -.48$, Arnstein, 2000; Hadjistavropoulos et al., 2007) in chronic pain samples. To this author's knowledge, only one study has explored the association between self-compassion and pain intensity and they did not find a significant relationship between these two constructs (Wren et al., 2011). However, given the limited research in this area, it is difficult to draw any definitive conclusions regarding the association between pain severity and self-compassion. Moreover, this study was conducted with individuals who experienced persistent musculoskeletal pain which may be different from other types of chronic pain. Therefore, we posed a research question to assess whether both a self-compassion and a self-efficacy intervention would reduce pain severity.

Research Question 3: Will participants report improvements in their psychological

well-being at follow-up?

Research Question 3a: Will participants in both the self-compassion and self-efficacy conditions report an increase in life satisfaction?

Research Question 3b: Will participants in both the self-compassion and self-efficacy conditions report a decrease in depression symptoms?

Life satisfaction in this study refers to global satisfaction with life. While studies have not specifically explored this construct in similar writing exercises, other well-being constructs have been analyzed. Research employing a the self-compassion writing intervention found that the writing increased happiness and reduced depression in a general internet sample as compared to a neutral writing condition (Shapira & Mongrain, 2010). Other interventions that have incorporated self-compassion have found similar results. A pilot study on compassionate mind training, which includes self-compassion letter-writing exercises, was found to reduce depression and increase the ability to self-soothe in participants with chronic mental health difficulties (Gilbert & Procter, 2006). Thus self-compassion appears to reduce depression and increase psychological well-being in both community samples as well as samples with more serious problems, which suggests that the intervention may produce similar results in those with chronic pain.

Studies that have used self-efficacy writing interventions have not explored their effect on well-being. However, other interventions that have focused on enhancing self-efficacy for pain management have found that these interventions reduced depression and increased life satisfaction (LeFort, 2000; Mangels et al., 2009). Moreover, higher chronic pain self-efficacy has been associated with lower

depression (e.g., $r = -.51$; Anderson et al., 1995; Arnstein, 2000). Thus a self-efficacy writing intervention may also increase life satisfaction and reduce depression.

Research Question 4: Will participants' affect change over the course of the three writing sessions for the self-compassion and self-efficacy conditions?

Research Question 4a: Will participants' positive affect change over the course of the three writing sessions for the self-compassion and self-efficacy conditions?

Research Question 4b: Will participants' negative affect change over the course of the three writing sessions for the self-compassion and self-efficacy conditions?

There has been limited research and mixed results on the impact that self-compassion writing interventions have on affect. Leary et al. (2007) found that participants in a brief self-compassion writing condition reported significantly lower negative affect immediately after writing than participants in a neutral writing condition. However, Zabelina and Robinson (2010) did not find any influence on mood after participants completed a brief self-compassion intervention. While the self-compassion intervention literature is limited, correlational studies have found that higher levels of self-compassion are associated with higher levels of positive affect and lower levels of negative affect in those with chronic pain (Wren et al., 2011).

Similarly, few studies have explored the effect of self-efficacy writing interventions on affect. One study found that a self-efficacy writing intervention increased positive affect, but had no effect on negative affect (Kirk et al., 2011). Correlational studies with chronic pain populations have found that higher pain self-

efficacy is associated with higher positive affect ($r=-.41$) (Barlow, Cullen, & Rowe, 2002) and lower negative affect ($r=-.37$) (Hadjistavropoulos et al., 2007). These mixed findings indicate that the effect of a self-compassion and a self-efficacy writing intervention on positive and negative affect requires further exploration.

Research Question 5: Will participants' subjective evaluations over the course of the three writing sessions differ for the self-compassion and self-efficacy conditions?

Research Question 5a: Will participants in the self-compassion condition rate their essays as more personal as compared to those in the self-efficacy condition?

Research Question 5b: Will participants in the self-compassion condition rate their essays as more emotional as compared to those in the self-efficacy condition?

Research Question 5c: Will participants in the self-efficacy condition report that writing has affected how they think about their pain more as compared to those in the self-compassion condition?

Research Question 5d: Will participants in the self-compassion condition report greater improvement in how they feel about their pain as compared to those in the self-efficacy condition?

Research Question 5e: Will participants in the self-compassion condition report feeling more understood and accepting of their pain experiences as compared to those in the self-efficacy condition?

Research Question 5f: Will participants in the self-efficacy condition report feeling more confident about managing their pain as compared to those in the self-compassion condition?

Research on the expressive writing paradigm has often assessed participants' subjective evaluations of the exercise in order to determine how participants experience the intervention (Frattaroli, 2006; Pennebaker & Beall, 1986). This is important to study since participants' perceptions may inform how to implement the task in the future and on a larger scale. Studies using self-compassion and self-efficacy writing interventions have not explored participants' subjective evaluations. However, research on the subjective evaluations of positive expressive writing interventions can provide an idea of how participants might respond. Participants in positive writing interventions (e.g., benefit-finding, positive experiences, self-regulation) reported that their essays were more personal and emotional as compared to participants in the control group (Burton & King, 2004; Cameron & Nicholls, 1998; Stanton et al., 2002). Moreover, participants who wrote about self-regulation reported that they continued to think about the topic after their sessions (Cameron & Nicholls, 1998). Finally, participants who wrote about benefit-finding reported that the experience enhanced their understanding of their experience (Stanton et al., 2002).

Since both the self-efficacy and the self-compassion writing interventions can be thought of as positive interventions, both conditions may lead to the similar subjective evaluations. However, the two conditions required participants to write in different ways. Since the self-compassion writing emphasized self-kindness, understanding, and acceptance of emotions, participants in this condition may rate their essays as more personal and emotional and feel more accepting of their pain experiences. On the other hand, the self-efficacy writing emphasized pain management strategies and thinking about ways to cope with the pain. Thus,

participants in the self-efficacy condition may feel that their essays influenced how they think about their pain and may feel more confident in managing their pain.

Research Question 6: Does pain catastrophizing moderate the effectiveness of the two writing conditions?

Research Question 6a: Will participants who score higher on pain catastrophizing report higher scores on the pain willingness subscale of the Chronic Pain Acceptance Questionnaire in the self-compassion condition as compared to the self-efficacy condition?

Research Question 6b: Will participants who score higher on pain catastrophizing report higher scores on the activities engagement subscale of the Chronic Pain Acceptance Questionnaire in the self-compassion condition as compared to the self-efficacy condition?

Research Question 6c: Will participants who score higher on pain catastrophizing report lower illness intrusiveness in the self-compassion condition as compared to the self-efficacy condition?

Research Question 6d: Will participants who score higher on pain catastrophizing report lower pain severity in the self-compassion condition as compared to the self-efficacy condition?

Research Question 6e: Will participants who score higher on pain catastrophizing report higher life satisfaction in the self-compassion condition as compared to the self-efficacy condition?

Research Question 6f: Will participants who score higher on pain catastrophizing report fewer depression symptoms in the self-compassion condition

as compared to the self-efficacy condition?

To this author's knowledge pain catastrophizing has not been explored as a moderator in self-compassion or self-efficacy intervention studies. However, pain catastrophizing has been tested as a moderator in the traditional expressive writing paradigm. Results indicate that expressive writing interventions may be particularly beneficial for those high in pain catastrophizing (Norman et al., 2004; Sullivan & Neish, 1999). Sullivan (2012) has suggested that reducing catastrophizing should not be the ultimate objective of an intervention, but should be viewed instead as an obstacle to recovery progress for those with chronic health problems. As such, the self-compassion writing intervention does not specifically focus on pain catastrophizing, but does employ some components that may particularly benefit those who are high in pain catastrophizing. Research suggests that interventions that are empathic, validating and involve disclosure, all of which are elements of the self-compassion intervention, may be particularly effective for those high in pain catastrophizing (Cano et al., 2008; Linton, Boersma, Vangronsveld, & Fruzzetti, in press; Thorn, Ward, Sullivan, & Boothby, 2003). Moreover, mindfulness, a component of self-compassion, has been found to negatively correlate with pain catastrophizing (Cassidy et al., 2012; Schutze et al., 2010) and may help keep painful experiences in awareness without exaggerating them. In addition, common humanity, another component of self-compassion, could help those who are high in pain catastrophizing feel less isolated and feel a greater sense of social connectedness (Wren et al., 2011). However, pain self-efficacy has also been found to be negatively associated with pain catastrophizing (Shelby et al., 2008). Given, the lack of research in this area, it

remains unknown how pain catastrophizing may affect participants' response to a self-efficacy or a self-compassion intervention.

Chapter 4: Method

Design

The design of the current study was an experimental field study. Participants were randomized to either a self-compassion writing condition or a self-efficacy writing condition. All participants were asked to complete baseline measures of demographic information, pain severity, illness intrusiveness, pain acceptance (i.e., pain willingness and activities engagement), chronic pain self-efficacy, pain catastrophizing, self-compassion, depression, and life satisfaction. Participants were then asked to write for 20 minutes regarding self-compassion for their chronic pain or self-efficacy for coping with their chronic pain once a week for three consecutive weeks. The first writing session was scheduled to take place within one week of when the participants completed the baseline measures. The length and timing of the writing sessions were based on meta-analytic findings regarding the optimal conditions for producing effective writing interventions (Frattaroli, 2006). Directly before and after the writing intervention, participants completed a measure of positive and negative affect. In addition, directly after the writing session, participants completed six questions regarding their subjective experience of the writing task. One week after the final writing session, participants were asked to complete all baseline measures again (except the demographic information) as well as follow-up questions about their experience participating in the study. The entire study took place online through Survey Monkey. The researcher emailed participants with the link to the measures and the writing interventions on the days that they needed to complete

them. Reminder emails were sent if participants did not complete the measures or intervention after two days, and again after four days.

Participants

A power analysis was conducted in order to determine the number of participants needed for the study. According to Cohen's (1992) recommendations, 82 participants were needed for a multiple regression with four predictor variables to achieve a power of .80, a significance level of .01 and a medium effect size (Cohen, 1988). Since I conducted tests on specific regression coefficients (e.g., pain catastrophizing x writing condition), the power analysis was based on the number of participants I needed to detect a significant regression coefficient rather than an overall R-squared. The .01 significance level was based on Bonferroni correction to control for the experimentwise Type I error rate that may occur when running multiple regressions. I chose 0.10 as the upper limit for the experimentwise error rate and this probability divided by six (the number of regression analyses I planned to conduct) was .01. The effect size was based on the literature for the general expressive writing paradigm since there has been a lack of research on the effect size for the specific type of expressive writing used in this study. In the literature, meta-analyses have typically found small effect sizes for the general expressive writing paradigm across studies and outcomes (Frattaroli, 2006; Frisina et al., 2004; Smyth, 1998). However, studies with populations who have a higher level of distress, such as those with chronic pain, have found medium to large effect sizes (Harris, 2006). Moreover, studies have found medium to large effect sizes for the impact of the general expressive writing paradigm on the outcome variables used in this study

(Broderick et al., 2005; Kelly et al., 2010; Norman et al., 2004; Rosenberg et al., 2002; Shapira & Mongrain, 2010). In addition, pain catastrophizing has been found to have a small to medium effect ($f^2=.10$) as a moderator for the general expressive writing paradigm on physical disability (Norman et al., 2004).

Participants needed to meet the following eligibility criteria (see Appendix A and B): at least 18 years old, able to read and write in English, diagnosed with chronic pain or a chronic pain condition, or discussed pain management strategies with a doctor, experiencing pain on most days of the month for at least six months (Wren et al., 2011), having pain that was *not* directly caused by a terminal condition, and report a score of at least 5 on a 10-point scale for the worst pain experienced within the past six months which is based on the cutoff for moderate pain in the literature (Serlin, Mendoza, Nakamura, Edwards, & Cleeland, 1995).

Overall, 140 individuals enrolled in the study and gave informed consent. Thirty participants dropped out of the study, 17 were disqualified, and 93 completed the study. Of the individuals who were disqualified from the study, 8 did not meet the inclusion criteria and 9 did not comply with the intervention (e.g., consistently did not spend enough time on the writing, did not write in a comprehensible way, did not complete the writing within a reasonable time-frame). Some individuals dropped out of the study before they were randomized to a writing condition ($n=7$). Among those who were randomized to a writing condition, 14 dropped out of the self-compassion condition (78.1% completion rate) and 9 dropped out of the self-efficacy condition (82.7% completion rate). Most of the dropouts tended to occur early in the study, after the baseline survey ($n=10$) or after the first writing session ($n=8$).

Thus, a total of 50 participants (82.0% female) completed the self-compassion condition and 43 (90.7% female) participants completed the self-efficacy condition. The average age of participants was 48.9 (SD=, range=19-72) in the self-compassion condition and 50.4 (SD=, range=26-74) in the self-efficacy condition. The large majority of participants were from the U.S. (self-compassion=90.0%; self-efficacy=93.0%) and identified as White (self-compassion=88%; self-efficacy=100%). Most participants were married or in a married-like relationship (self-compassion=60.0%; self-efficacy=72.1%) and were not employed (self-compassion=72.0%; self-efficacy= 51.2%). However, a significantly larger percentage of participants were employed full-time in the self-efficacy condition (34.9%) as compared to the self-compassion condition (8.0%; $\chi^2=11.57$, $p<.01$). Participants in both writing conditions had been living with pain for many years and most reported that they took medication for pain (self-compassion=94.0%; self-efficacy=97.7%) For a more comprehensive picture of participants' demographic information, see Table 1.

In order to contextualize our sample, the demographics were compared to the U.S. population in general. There was a higher proportion of women in this study (86%) as compared to the U.S. population (50.8%; U.S. Census Bureau, 2013). The median age of 51.0 in this sample was older than in the U.S. population (median age=37.3; U.S. Census Bureau, 2013), which may be partially due to the inclusion criteria in this study that participants had to be at least 18. Also, chronic pain has been found to increase with age (Institute of Medicine, 2011). The sample in this study was better educated (bachelor's degree or higher=58.0%) than the overall U.S. population

(bachelor's degree or higher=28.2%), but their reported income was comparable to the U.S. median household income of \$52,762 (U.S. Census Bureau, 2013). It is likely that their income was lower than what might be expected for the high education level due to the large percentage of participants who were not employed (62.4%). This is much higher than the 26.0% of people in the U.S. who reported that they did not work in 2011 (U.S. Census Bureau, 2013). This is also higher than the 24.3% of women in the U.S. between the ages of 45-54 who were not in the labor force in 2011 (U.S. Census Bureau, 2013). The implications of these differences will be explored further in the discussion section.

Table 1. *Demographics*

<i>Race/Ethnicity</i>	<i>Self-Compassion</i>		<i>Self-Efficacy</i>		<i>Total Sample</i>	
	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>
African American	2	4.0%	0	0%	2	2.2%
Asian American	2	4.0%	0	0%	2	2.2%
Asian Indian/Pakistani	2	4.0%	0	0%	2	2.2%
Middle-Eastern/Arab	0	0%	0	0%	0	0%
Biracial/Multiracial	2	4.0%	0	0%	2	2.2%
Hispanic/Latino(a)	2	4.0%	0	0%	2	2.2%
Native American	2	4.0%	3	7%	5	5.4%
White	44	88%	43	100%	87	93.5%

*Percentages exceed 100% since participants could list multiple races/ethnicities

<i>Relationship Status</i>	<i>Self-Compassion</i>		<i>Self-Efficacy</i>		<i>Total Sample</i>	
	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>
Married	30	60.0%	31	72.1%	61	65.6%
In a relationship	3	6.0%	3	7.0%	6	6.5%
Divorced	10	20.0%	5	11.6%	15	16.1%
Single	7	14.0%	2	4.7%	9	9.7%
Separated	0	0%	1	2.3%	1	1.1%
Widowed	0	0%	1	2.3%	1	1.1%

<i>Education</i>	<i>Self-Compassion</i>		<i>Self-Efficacy</i>		<i>Total Sample</i>	
	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>
Grade school	1	2.0%	0	0%	1	1.1%
High school	3	6.0%	2	4.7%	5	5.4%
Some college	20	40.0%	13	30.2%	33	35.5%
College	16	32.0%	15	34.9%	31	33.3%
Graduate school	10	20.0%	13	30.2%	23	24.7%

<i>Income</i>	<i>Self-Compassion</i>		<i>Self-Efficacy</i>		<i>Total Sample</i>	
	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>
Less than \$30,000	16	32.7%	13	30.2%	29	31.5%
\$30,000-\$59,999	19	38.8%	12	27.9%	31	33.7%
\$60,000-\$99,999	10	20.4%	11	25.6%	21	22.8%
\$100,000-\$149,999	2	4.1%	5	11.6%	7	7.6%
\$150,000+	2	4.1%	2	4.7%	4	4.3%

<i>Employment Status</i>	<i>Self-Compassion</i>		<i>Self-Efficacy</i>		<i>Total Sample</i>	
	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>
Not employed	36	72.0%	22	51.2%	58	62.4%
Employed part-time	8	16.0%	6	14.0%	14	15.1%
Employed full-time	4	8.0%	15	34.9%	19	20.4%
Student	2	4.0%	0	0%	2	2.2%

<i>Length of Time in Pain</i>	<i>Self-Compassion</i>		<i>Self-Efficacy</i>		<i>Total Sample</i>	
	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>
6 months – 1 year	1	2.0%	0	0%	1	1.1%
1 – 3 years	7	14.0%	5	11.6%	12	12.9%
4 – 8 years	9	18.0%	12	27.9%	21	22.6%
9 – 15 years	10	20.0%	10	23.3%	20	21.5%
15+ years	23	46.0%	16	37.2%	39	41.9%

<i>Recruitment</i>	<i>Self-Compassion</i>		<i>Self-Efficacy</i>		<i>Total Sample</i>	
	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>
Facebook/Twitter	7	14.3%	2	4.8%	9	9.9%
Forum	19	38.8%	24	57.1%	43	47.3%
Newsletter/email	11	22.4%	8	19.0%	21	23.1%
Support group	3	6.1%	6	14.3%	9	9.9%
NIH	6	12.2%	1	2.4%	7	7.7%
Referral	3	6.1%	1	2.4%	4	4.4%

<i>Pain Treatment</i>	<i>Self-Compassion</i>		<i>Self-Efficacy</i>		<i>Total Sample</i>	
	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>
Medication	47	94.0%	42	97.7%	89	95.7%
Psychotherapy	6	12.0%	7	16.3%	13	14.0%
Biofeedback	0	0%	6	14.0%	6	6.5%
Acupuncture	2	4.0%	4	9.3%	6	6.5%
Chiropractic	7	14.0%	6	14.0%	13	14.0%
Support group	14	28.0%	16	37.2%	30	32.3%
Electrical stimulation	12	24.0%	6	14.0%	18	19.4%
Physical therapy	15	30.0%	22	51.2%	37	40.0%
Hypnosis	1	2.0%	1	2.3%	2	2.2%
Other	17	34.0%	11	25.6%	28	30.1%

*Percentages exceed 100% since participants could list multiple pain treatments

<i>Cause of Pain</i>	<i>Self-Compassion</i>		<i>Self-Efficacy</i>		<i>Total Sample</i>	
	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>
Arthritis	20	40.0%	15	34.9%	35	37.6%
Fibromyalgia	17	34.0%	14	32.6%	31	33.3%
Migraines	10	20.0%	10	23.3%	20	21.5%
Degenerative Disc Disease	4	8.0%	11	25.6%	15	16.1%
Other	18	36.0%	15	34.9%	33	35.5%
Unknown	3	6.0%	0	0%	3	3.2%

*Percentages exceed 100% since participants could list multiple causes of pain

<i>Location of Pain</i>	<i>Self-Compassion</i>		<i>Self-Efficacy</i>		<i>Total Sample</i>	
	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>
Whole Body	15	30.6%	12	27.9%	27	29.3%
Legs	13	26.5%	10	23.3%	23	25.0%
Head	10	20.4%	13	30.2%	23	25.0%
Back	23	46.9%	25	58.1%	48	52.2%
Joints	7	14.3%	6	14.0%	13	14.1%
Pelvis/Core	7	14.3%	3	7.0%	10	10.9%
Arms	5	10.2%	5	11.6%	10	10.9%

*Percentages exceed 100% since participants could list multiple locations of pain

Measures

Demographic

The demographic questionnaire asked participants for their age, sex, race, level of education, income, country of residence, employment status, relationship

status, source of chronic pain, location of chronic pain, duration of pain, current treatment received, average pain, current pain, and least amount of pain within the past 6 months (see Appendix C).

Illness Intrusiveness Rating Scale

The Illness Intrusiveness Rating Scale (IIRS; Devins et al., 1983) is commonly used as a measure of health-related quality of life in chronic diseases and specifically measures the extent to which a disease or treatment interfere with various life domains (e.g., health, diet, work, etc.; see Appendix D). The IIRS contains 12 items and the instructions ask respondents to indicate the extent to which the illness or the treatment interferes with each activity. In the present study, the directions were modified to ask specifically about chronic pain and its treatment. Items were rated on a 7-point scale (1=Not very much; 7=Very much) and summed to create a total score ranging from 12 to 84. Higher scores indicate greater interference as a result of chronic pain and its treatment.

While the IIRS was originally developed for those with end-stage renal disease (Devins et al., 1983), high validity and reliability has been found for samples with medical and psychiatric conditions, including chronic pain (e.g., Antony, Roth, Swinson, Huta, & Devins, 1998; Devins, 2010; Novak, Anastakis, Beatory, Mackinnon, & Katz, 2010). High internal consistency has been found in chronic pain samples (Fibromyalgia: $\alpha=.89$; Rheumatoid arthritis: $\alpha=.87$) and the measure has demonstrated high test-retest reliability ($\alpha=.79-.85$) (Devins, 2010). Moreover, evidence indicates that the IIRS can be self-administered online without compromising the reliability of the scores or biasing the results (Ritter, Lorig,

Laurent, & Matthews, 2004). In chronic pain samples, the IIRS has been found to positively correlate with pain severity (Li et al., 2011) and predict pain disability (Novak et al., 2010). The IIRS also appears to be sensitive to changes that occur as a result of interventions. Illness intrusiveness decreased significantly after supportive-expressive, group psychotherapy for women living with systemic lupus erythematosus (Edworthy et al., 2003), patient education to increase self-management of chronic disease (Co, Jaramillo, Grimsley, Jacob, & Reich, 2009), and online chronic disease self-management for diverse conditions (Lorig, Ritter, Laurent, & Plant, 2006). In the current study, the Cronbach's alpha was .86 for the pretest and .87 for the posttest assessments.

The Chronic Pain Acceptance Questionnaire

The Chronic Pain Acceptance Questionnaire (CPAQ) was originally developed as a 20-item measure that assesses the degree of adjustment to pain in terms of identity and lifestyle (McCracken et al., 2004). Recently, a short 8-item version (CPAQ-8) was developed in a chronic pain sample and found to be reliable and valid (Fish, McGuire, Hogan, Morrison, & Stewart, 2010; see Appendix E). Exploratory and confirmatory factor analysis has supported a two-factor structure in both the original and the shortened version consisting of activities engagement and pain willingness (Fish et al., 2010; McCracken et al., 2004; Vowles, McCracken, McLeod, & Eccleston, 2008). Activities engagement assesses the degree of engagement in life activities regardless of pain. Examples of items from this subscale include, "When my pain increases, I can still take care of my responsibilities," and "I lead a full life even though I have chronic pain." Pain willingness assesses the degree

of willingness to experience pain without attempts to control it. Examples of items from this subscale include, “I avoid putting myself in situations where my pain might increase,” and “Before I can make any serious plans, I have to get some control over my pain.” Each item is rated on a 7-point scale (0=never true, 6=always true) and the pain willingness items are reverse scored so that higher scores indicate higher pain acceptance. Each subscale contains four items and the items are summed so that scores range from 0 to 24 for both the activity engagement and the pain willingness subscales. Higher scores indicate higher activity engagement or higher pain willingness. In this study, the CPAQ-8 was used and the two subscales were used as opposed to the total score, as is consistent with previous research (e.g., Costa & Pinto-Gouveia, 2011).

High reliability and validity have been found in online chronic pain samples for the CPAQ-8. Cronbach’s alphas have ranged from .85 for the total score, .77 for the pain willingness subscale, and .89 for the activities engagement subscale (Fish et al., 2010). Moreover, the CPAQ-8 replicated the pattern of correlations that was obtained using the full-length scale, which provides evidence for the validity of CPAQ-8 scores. Specifically, the CPAQ-8 total score and subscales were correlated with medical visits for pain, depression, anxiety, pain interference, and pain severity (Fish et al., 2010). In the current study, the Cronbach’s alpha for the pain willingness subscale was .76 for the pretest and .72 for the posttest; the Cronbach’s alpha for the activity engagement was .86 for the pretest and .87 for the posttest.

The Self Compassion Scale

The Self Compassion Scale (SCS) was originally developed as a 26-item measure that provides a global score of self-compassion as well as scores for six subscales: self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification (Neff, 2003). Recently, a shortened 12-item version of the SCS (Self Compassion Scale-Short Form; SCS-SF) was developed and found to be reliable and valid (Raes, Pommier, Neff, & Van Gucht, 2011; see Appendix F). Confirmatory factor analysis supported the same six-factor structure as in the original scale as well as a single higher-order factor for self-compassion. In this study, the global score of the SCS-SF was used to determine whether the self-compassion intervention increased self-compassion significantly more than the self-efficacy condition. Examples of items from the scale include, “I try to see my failings as part of the human condition,” and “When something upsets me I try to keep my emotions in balance.” Each item is rated on a 5 point scale (1=almost never, 5=almost always) and items on the self-judgment, isolation, and over-identification subscales are reverse scored. Items are summed and total scores range from 12 to 60, where higher scores indicate greater self-compassion.

Adequate internal consistency has been found in a number of samples for the SCS-SF, with Cronbach’s alpha above .86 for all samples (Raes et al., 2011). While both the SCS and the SCS-SF were normed on college sample populations (Neff, 2003; Raes et al., 2011), the SCS has also been used with chronic pain patients. High internal consistency has been found in chronic pain samples as evidenced by a Cronbach’s alpha of .95 (Costa & Pinto-Gouveia, 2011). Moreover, in chronic pain

samples, the SCS positively correlated with positive affect, pain self-efficacy, and pain acceptance (CPAQ; McCracken et al., 2004), and negatively correlated with negative affect, depression, anxiety, stress, pain catastrophizing, and pain disability (Costa & Pinto-Gouveia, 2011; Wren et al., 2011). In the current study, the Cronbach's alpha for the SCS-SF was .87 for the pretest and .88 for the posttest.

The Center for Epidemiological Studies – Depression Scales

The Center for Epidemiological Studies - Depression Scales (CES-D) was originally developed as a 20-item measure that diagnoses and evaluates depressive symptoms (Radloff, 1977). A 10-item short-form CES-D was developed and scores for this measure have been found to be reliable and valid (Cole, Rabin, Smith, & Kaufman, 2004; see Appendix G). As with the full-length version, the short form assesses the frequency of depressive symptoms over the past week on a 4-point scale (0=less than one day, 3=5-7 days). Sample items include “I was bothered by things that don't usually bother me” and “I felt fearful.” Items are summed to create a range from 0-30, where higher scores indicate more depressive symptoms, while taking into account the frequency of the symptoms over the past week.

Cronbach's alphas for the CES-D short-form has ranged from .75 to .82, indicating good internal consistency (Cole et al., 2004). Moreover, the CES-D short-form was highly correlated ($r=.74$; Cole et al., 2004) with the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). To the author's knowledge the CES-D short-form has not been used with a chronic pain sample, however, the original CES-D has been used extensively with chronic pain patients (Walsh et al., 2006). Geisser, Roth, and Robinson (1997) found that the CES-D was

able to significantly discriminate between chronic pain patients with and without major depression, indicating high predictive validity in this population. A literature review identified the CES-D as a psychometrically sound, clinically-useful assessment instrument for those with chronic pain (Grimmer-Somers, Vipond, Kumar, & Hall, 2009). In this study, the Cronbach's alpha for the CES-D short form was .85 for the pretest and .90 for the posttest.

The Satisfaction with Life Scale

The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) represents a widely used measure of global life satisfaction (see Appendix H). The scale contains five items, examples of which include, "If I could live my life over, I would change almost nothing" and "I am satisfied with my life." Items are rated on a 7-point scale (1=strongly disagree, 7=strongly agree) and summed to create a total score which can range from 5 to 35. Higher scores indicate higher life satisfaction.

The SWLS is often used as a marker of subjective well-being since it assesses an individuals' conscious evaluative judgment of his or her life by using the person's own criteria (Diener et al., 1985). A review of the scale found strong convergent and discriminant validity as well as a degree of temporal stability (e.g., .54 for 4 years), but also found that the scores are sensitive enough to detect changes that may occur during clinical interventions (Pavot & Diener, 1993). Specifically, the SWLS has been found to be sensitive to change in emotional states caused by expressive writing (Frattaroli, 2006). The SWLS has also been validated in chronic pain populations, and high internal consistency has been found in these samples (Cronbach's alpha range of

.83 to .86; Dezutter, Robertson, Luyckx, & Hutsebaut, 2010; Walker, Esterhuyse, & Van Lill, 2010). Within chronic pain samples, the SWLS negatively correlates with pain severity (Dezutter, Robertson, Luyckx, & Hutsebaut, 2010), pain intensity and frequency (Cohen, Patel, Khetpal, Peterson, & Kimmel, 2007), and perceived stress (Walker et al., 2010). In the present study, the Cronbach's alpha for the SWLS was .89 for both the pretest and the posttest.

Positive and Negative Affect Schedule

The Positive and Negative Affect Schedule (PANAS) was originally developed as a 20-item measure of individual differences in positive and negative affective levels (Watson, Clark, & Tellegen, 1988). A 10-item PANAS short-form has been developed based on the original (Kercher, 1992; see Appendix I). The PANAS short-form includes five positive emotions (alert, inspired, excited, enthusiastic, and determined) and five negative emotions (afraid, upset, nervous distressed, and scared). Confirmatory factor analyses have supported a two-factor structure of positive affect and negative affect for both the original PANAS and the short-form (Crawford & Henry, 2004; Mackinnon et al., 1999). Participants rate how intensely they currently feel each emotion on a 5-point scale (1=very slightly or not at all, 5=extremely). Items of the five positive emotions are summed to create the positive affect (PA) scale and items of the five negative emotions are summed to create the negative affect (NA) scale. Total scores range from 5 to 25 for the PA and NA, where higher scores indicate higher positive and negative affect, respectively.

In terms of the PANAS short form, cronbach's alphas have ranged from .75 to .78 for the positive affect scale and .81 to .87 for the negative affect scale (Kercher,

1992; Mackinnon et al., 1999), indicating good internal consistency. The PANAS has been used with a multitude of clinical and healthy populations, including chronic pain samples (e.g., Davis, Zautra, & Reich, 2001). High internal consistency has been found in chronic pain populations, where one study found a Cronbach's alpha of .88 for PA and .84 for NA (Zautra et al., 2005). In the current study, the Cronbach's alphas for the PANAS short form PA ranged from .77-.87 for the three pre-writing scores and .85-.89 for the post-writing scores; the Cronbach's alphas for NA ranged from .86-.92 for the pre-writing and .87-.91 for the post-writing scores.

Pain Catastrophizing Scale

The Pain Catastrophizing Scale (PCS; Sullivan, Bishop, & Pivik, 1995) is a 13-item scale that measures catastrophizing cognitions related to physically painful experiences (see Appendix J). EFA and CFA analyses have found that the PCS measures a single construct characterized by three related dimensions: rumination, magnification, and helplessness (Osman et al., 2000; Osman et al., 1997; Sullivan et al., 1995). As such, the total score, rather than the subscales were used in this study. Example items include, "When I'm in pain I cannot seem to keep it out of my mind" (rumination subscale), "When I'm in pain I think of other painful experiences" (magnification subscale), and "When I'm in pain I feel I cannot go on" (helplessness subscale). Items are rated on a five-point scale (0=Not at all, 4=All the time) and summed to create a total score ranging from 0 to 52. Higher scores indicate greater pain catastrophizing.

High reliability and validity have been found in samples that have used the PCS (Osman et al., 1997; Sullivan et al., 1995). Test-retest reliability has ranged from

.73 to .75 (Lamé, Peters, Kessels, van Kleef, & Patijn, 2008; Sullivan et al., 1995), suggesting that scores have a high degree of stability. While the PCS was not initially developed with chronic pain samples (Sullivan et al., 1995), it has been shown to have sound psychometric properties for this population. In a pain outpatient sample, the Cronbach's alpha for the total PCS was high, .92 (Osman et al., 2000). The scale also significantly correlated with pain severity and pain interference measures, however, these correlations were moderate indicating that the PCS measures a different construct from other pain indices. In addition, the scale positively correlated with negative affect and negatively correlated with positive affect. Finally, the PCS has been found to significantly differentiate between pain outpatient and community samples (Osman et al., 2000). In the current study, the Cronbach's alphas were .94 for the pretest and .95 for the posttest.

Chronic Pain Self-Efficacy Scale

The Chronic Pain Self-Efficacy Scale (CPSS) is a 22-item measure that assesses individuals' confidence in coping with the consequences of chronic pain (Anderson et al., 1995; See Appendix K). The scale consists of three subscales: self-efficacy for pain management (PSE), self-efficacy for physical function (FSE), and self-efficacy for coping with symptoms (CSE). The PSE subscale contains five items, such as, "How certain are you that you can continue most of your daily activities?" The FSE contains nine items, such as, "How certain are you that you can shop for groceries or clothes?" The CSE contains eight items, such as, "How certain are you that you can control your fatigue?" Items are rated on a 10-point scale (1=very uncertain, 10=very certain) where higher scores indicate higher self-efficacy. The

items are averaged to create a total score. In this study, the total score was used as opposed to the three subscales as is consistent with previous research (Arnstein, 2000; Litt, Shafer, & Kreutzer, 2010; Wren et al., 2011).

The CPSS was developed with chronic pain patients in an outpatient pain management program and has been found to have high reliability in a wide variety of chronic pain populations, with Cronbach's alphas ranging from .82 to .96 for the subscales and the total score. (Anderson et al., 1995; Arnstein, 2000; Litt et al., 2010; Wren et al., 2011). Moreover, high validity has been found in chronic pain samples as well. The CPSS significantly correlated in the expected direction with depressive symptoms, hopelessness, positive mood, pain severity, pain interference, and perceived life control (Anderson et al., 1995). Moreover, the scale has been found to predict pain disability, pain severity, pain interference, general activity, affective distress and life control (Anderson et al., 1995; Arnstein, 2000; Hadjistavropoulos, Dash, Hadjistavropoulos, & Sullivan, 2007). In the current study, the Cronbach's alphas .93 for the pretest and .94 for the posttest.

Subjective Evaluation of Writing Task

The Subjective Evaluation of Writing Task scale is a widely used measure in expressive writing studies that assesses participants' perceptions of their writing experience. The items used in this study were adapted from the original expressive writing study (Pennebaker & Beall, 1986) as well as more recent expressive writing research (Earnhardt, Martz, Ballard, & Curtin, 2002). Participants used a Likert-type scale ranging from "not at all" (1) to "to a great deal" (7), to assess the following aspects of their writing: (a) How personal were your essays? (b) To what degree did

you reveal your emotions in your essays? (c) Do you believe that writing about this topic has affected how you think about this topic? (d) Do you believe facing this topic in your writing has improved the way you feel about it? (e) To what degree did writing about this topic make you feel understood and more accepting of your pain? and (f) To what degree did writing about this topic make you feel more confident about managing your pain? (see Appendix L). The last two items were added to reflect the specific directions in the self-compassion and the self-efficacy writing intervention, respectively. Consistent with previous research, each item was considered separately since they measure different aspects of the experimental manipulation.

Follow-up Questions

Participants were asked five questions in the follow-up survey in order to assess how participating in the study might have influenced their everyday experiences. They included: (a) Prior to this study, to what extent had you discussed some of the things you wrote about? (b) Between writing sessions, to what extent did you discuss some of the things you wrote about with others? (c) To what extent do significant others in your life understand what it is like for you to be in pain? (d) How helpful did you find the writing sessions? (e) How likely would you be to do this type of writing on your own? (See Appendix M). Participants used a Likert-type scale ranging from “not at all” (1) to “to a great deal” (7) to rate their answers. Each item was considered separately since they measure different aspects of the experimental manipulation.

In the follow-up survey, participants were also asked the same four questions

about their pain severity from the baseline survey. These items were included so that changes in pain severity at the end of the study as compared to the beginning of the study could be assessed. Participants were asked to rate their current pain as well as their worst pain, average pain, and least amount of pain within the past month on an 11 point scale (0=no pain, 10=pain as bad as you can imagine). Average pain was used as the primary measure of pain severity as is consistent with previous research (Serlin et al., 1995).

Procedures

Recruitment

Participants were recruited from online chronic pain forums, chronic pain listservs, and chronic pain support groups. In addition, the study was listed on clinicaltrials.gov which is a website run by the National Institutes of Health that allows researchers to recruit participants for clinical studies. An advertisement was posted to chronic pain forums, and sent to chronic pain listservs and support groups via email (see Appendix N).

The advertisement recruited participants who had been experiencing pain for at least six months that was not directly caused by a terminal condition and who were at least 18 years of age. Additional eligibility criteria included being able to read and write in English since this was the language used in the study. After completing the informed consent, participants were asked to complete several questions related to inclusion criteria, including a question about discussion of pain treatment methods with a doctor or diagnosis of chronic pain or a chronic pain condition, and a question about the worst pain experienced in the past six months on a 10-point scale. Only

participants who scored a 5 or above on the 10-point item were included in the study based on the traditional cutoff point for moderate levels of pain in the literature (Serlin et al., 1995). After participants completed the entire study, they were emailed a \$15 Amazon gift certificate in exchange for their participation along with a debriefing form (see Appendix O). In similar studies in which participants complete similar tasks over multiple time points, participants were generally compensated \$15-\$30 (Shapira & Mongrain, 2010). The first 50 gift certificates were funded by the Support Program for Advancing Research and Collaboration (SPARC) and the remaining gift certificates were funded by the researcher. However, after 100 people had started the study, the remaining participants were recruited without the offer of the \$15 gift certificate. As a result, 38 participants started the study without the offer of a gift card and of these 38 participants, 18 (47.4%) completed the study. This is in comparison to 103 participants who started the study with an offer of a gift certificate and of these 103 participants, 75 (72.8%) completed the study.

Experimental Design

Participants who agreed to participate in this research (see Appendix A for the informed consent) were asked to complete five separate portions of the study as detailed in the experimental procedures below. All portions of the study, including the writing intervention, were conducted online through Survey Monkey. The first and last portions of the study involved completing the dependent variables of interest so that both pre-intervention and post-intervention scores could be obtained. The writing intervention took place over the course of three sessions, each spaced one week apart, as is consistent with Pennebaker's expressive writing paradigm (Pennebaker, 1989).

An online format was chosen to test the effectiveness of the intervention since this is a more natural setting and indicative of how the intervention would be used as a supplement to chronic pain treatment. The outline below details the experimental design of the study.

Time 1

1. Consent form
2. Eligibility criteria
3. Baseline questionnaires: demographic info, SCS, CES-D, SWLS, CPAQ, PCS, IIRS, CPSS
4. Set up day for first writing session for upcoming week

Time 2 – Within 1 week of T1

1. Randomly assigned to one of two groups
2. PANAS-pre
3. Complete Self-Compassion Writing or Self-Efficacy Writing
4. PANAS-post and Subjective Evaluation

Time 3 – One week after T2

1. PANAS-pre
2. Complete Self-Compassion Writing or Self-Efficacy Writing
3. PANAS-post and Subjective Evaluation

Time 4 – One week after T3

1. PANAS-pre
2. Complete Self-Compassion Writing or Self-Efficacy Writing
3. PANAS-post and Subjective Evaluation

Time 5 – One week after T4

1. Post-intervention questionnaires: SCS, CES-D, SWLS, CPAQ, PCS, IIRS, CPSS, 4 pain severity questions (from demographics), follow-up questions
2. Remuneration and debriefing form sent

Time 1- Baseline. Participants who were interested in participating in the study were asked to email the investigator and were assigned four numbers to be used as their participant identification number. Participants were asked to enter their participant identification number each time they complete measures or the writing intervention so that responses could be linked. The participants were then emailed a

link that contained the informed consent. Once participants agreed to the consent form, they completed the inclusion criteria questions (described above). If participants scored below a 5 on the 10-point scale for worst pain or did not meet the other eligibility criteria (e.g., diagnosis of chronic pain or a chronic pain condition), they were sent to a different screen that thanked them for their interest in the study, but informed them that they were not eligible to participate. If participants scored a 5 or above and met the other inclusion criteria, then they were sent to a screen where they completed the baseline measures of demographic information, the Illness Intrusiveness Rating Scale, the Chronic Pain Self-Efficacy Scale, the Chronic Pain Acceptance Questionnaire, the Self-Compassion Scale, the Center for Epidemiological Studies-Depression Scale, the Pain Catastrophizing Scale, and the Satisfaction with Life Scale. The completion of all baseline measures took approximately 15 minutes. Participants were asked to provide a day within the subsequent week that they would like to start the writing intervention.

Time 2, 3, and 4 – Experimental intervention. Participants were randomized to either a self-compassion writing condition or a self-efficacy writing condition (see Appendix P). Participants were randomized using a random number generator where even numbers were assigned to the self-compassion condition and odd numbers were assigned to the self-efficacy condition. Participants were asked to write for 20 minutes on either a self-compassion topic or a self-efficacy topic once a week for three consecutive weeks. The length and timing of the writing sessions are based on meta-analytic findings regarding the optimal conditions for producing effective writing interventions (Frattaroli, 2006). Participants were asked to write in a quiet,

comfortable and private spot and not to worry about grammar, spelling or style, as per Pennebaker's (1989) recommendations. The researcher emailed participants the link for the writing intervention on the day of the week that they were scheduled. If participants did not complete the writing intervention within two days, the researcher sent a reminder email (see Appendix Q). Another reminder email was sent if the participant still had not completed the intervention within 4 days.

The writing instructions were piloted with three acquaintances of the researcher who had low to moderate chronic pain. These individuals read the instructions and practiced writing for 20 minutes and then gave feedback regarding the clarity of the exercise. Based on this feedback, the instructions were modified to be clearer and more specific. The general writing instructions given to all participants regardless of writing condition were as follows:

You have been randomly assigned to one of two types of writing exercises. Please write for 20 minutes in a quiet, comfortable and private spot. Do not worry about grammar, spelling, or style. Don't worry about deleting. The only rule is that once you begin writing, please continue to write until the 20 minutes has passed.

If you run out of things to say, just repeat what you have already written. Your writing will be kept confidential and only members of the research team will review the writing. Please note that no one on the research team will be reading your writing on a regular basis. If for any reason you feel you need to contact the researchers, please do so at kschaefer@umd.edu.

[For second and third writing sessions] Even though the directions are the same as your previous writing session, we know that you may have thought of other things that you might want to include. You can write in a way that builds upon your previous writing sessions.

Self-compassion writing condition. Approximately half of the participants were randomly assigned to the self-compassion writing group. The self-compassion writing intervention was based on previous studies that explored self-compassion writing (Shapira & Mongrain, 2010) and writing in chronic pain populations (Graham, Lobel, Glass, & Lokshina, 2008). Participants were asked to write about their experiences with pain in a way that made them feel accepted and understood. They received the following instructions:

For the three writing sessions, we would like you to write about your experience with chronic pain from a self-compassionate perspective. Self-compassion means to be kind to yourself and less self-critical or self-blaming. For example, try to have understanding for any distress you might be feeling and realize that your distress makes sense. Think about what you would say to a friend in your position, or what a friend would say to you about your experiences with pain. We would like you to write whatever comes to your mind, but make sure that the writing provides you with what you need in order to feel understood and not alone in your experiences with pain. You might write about how pain has affected your life, problems you have experienced because of your pain, and your feelings about those experiences. We realize that individuals with chronic pain experience a full range of emotions and we

want you to write from the perspective of someone who is accepting of these emotions. You can write different or similar accounts of your pain experiences each time. Please use a clock to keep track of your time and begin writing now. Please write for 20 minutes.

Self-efficacy writing condition. Approximately half of the participants were randomly assigned to the self-efficacy writing group. Writing instructions were written to mirror the self-compassion instructions in length and format and were based on Bandura's (1997) concept of performance accomplishments as a way to enhance self-efficacy. Participants were asked to selectively attend to previous personal mastery experiences in managing their chronic pain and to consider how they could apply what they've learned in their future coping strategies. They received the following instructions:

For the three writing sessions, we would like you to write about your experience with chronic pain from a self-efficacy perspective. Self-efficacy means to be confident that you can perform certain actions to get to a desired outcome. For example, think about what you've learned about your chronic pain experiences and how you've handled these experiences in the past. Think about your confidence in dealing with your pain and ways that you could enhance your confidence in your ability to deal with your pain. We would like you to write whatever comes to your mind, but make sure that the writing provides you with a space to express your thoughts and feelings about your ability to manage your pain. You might write about what helps you

cope with your pain, difficulties you have faced because of your pain and how you dealt with those difficulties, and what pain management strategies you plan to try in the future. We realize that individuals with chronic pain use a wide variety of coping mechanisms to deal with their pain and we want you to write about the strategies you think would work for you. You can write different or similar accounts of your pain experiences each time. Please use a clock to keep track of your time and begin writing now. Please write for 20 minutes.

Directly before and after the writing intervention, participants completed the PANAS-short form. Directly after the writing intervention, participants also completed the subjective evaluation of writing questions. Participants spent approximately 25 minutes each week completing the measures and writing intervention. The writing samples were saved on a password-protected computer, accessible to only the researcher in order to conduct manipulation checks.

Time 5 – Post-intervention. One week after the final writing session, the researcher emailed participants a link to complete all baseline measures again (except the demographic information) in addition to several follow-up questions. The same protocol for reminder emails was followed if the participants did not complete the follow-up survey. Once participants completed the follow-up survey, they received an email with a \$15 Amazon gift certificate and a full debriefing form about the nature of the study (See Appendix O). The debriefing form also gave participants the opportunity to take the other writing condition. It is estimated that participants spent a total of one hour and 45 minutes completing this study.

Chapter 5: Results

The results chapter includes preliminary analyses, manipulation checks, analysis of the research questions, and some additional analyses.

Preliminary Analyses

The analyses were completed using the statistical package software IBM SPSS Version 20. Each variable was checked for normality, internal consistency, and univariate outliers. The only variable that displayed skewness, as indicated by values greater than 1, was the PANAS Negative Affect scale. In addition the following scales displayed some kurtosis, as indicated by values greater than 1: the pretest CESD scores, the pretest Chronic Pain Acceptance Questionnaire – Activities Engagement subscale scores, the posttest average Chronic Pain Self Efficacy scores, and four of the PANAS Negative Affect scores. All other univariate distributions were close to normal for the other variables. The multivariate normality assumptions were met for the ANOVA and linear regression analyses and therefore, none of the variables were transformed. All of the scales yielded acceptable internal consistency as indicated by Cronbach's alphas ranging from .72 to .95. Reliability estimates, range, means, and standard deviations of all of the scales are presented in Table 2. There were no missing item values since participants could not continue unless they provided an answer to each question. Each variable was assessed for outliers by converting raw scores to standardized scores (i.e., z-scores) and assessing for data points that deviated from the mean of all cases. Values that were two or more standard deviations away from the mean were considered outliers and eliminated

from subsequent analyses as recommended by Lomax (2007). The number of outliers per scale ranged from zero to seven. There were seven participants who had outlier scores on multiple (greater than three) scales, which may reflect response style. All analyses were run with and without the outliers, and the outliers were found to unduly influence the results. The outliers were removed on the scale level rather than the subject level in order to retain as much data as possible.

Between-groups comparisons were made regarding demographic variables using ANOVAs and chi-square analyses. There was a significant difference between groups in employment status, where participants randomized to the self-compassion condition were more likely to be unemployed than those randomized to the self-efficacy condition ($\chi^2=11.57$; $p<.01$). Therefore, employment status was controlled for in subsequent analyses. Two-way mixed ANCOVAs were used to test Research Questions 2-5, with employment as a covariate. This type of analysis was chosen so that the main effects of pre- and post-intervention changes, regardless of writing condition, could be assessed in addition to the interaction between writing condition and pre-post changes in the dependent variables. Moderated multiple regression analysis was used to test Research Question 6 so that the potential moderator of pain catastrophizing could be included as a continuous variable as described below. The assumptions of mixed ANCOVAs and linear regression analyses were assessed, and steps were taken to address any violations that occurred as noted under these sections. All of the assumptions of the linear regression analyses, including normality, linearity, and homogeneity of variance, were met. A correlation matrix of Pearson's r correlation coefficients was created to capture information about the relationships

among all interval variables (see Tables 3). All of the correlations were in the expected direction.

Table 2. *Reliability estimates, range, means, and standard deviations for outcome variables*

<i>Measure</i>	<i>Alpha</i>	Self-Compassion		Self-Efficacy	
		<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
SWLS-Pre	.89	12.5	7.18	16.6	7.03
SWLS-Post	.89	14.5	7.84	16.9	7.64
CESD-Pre	.85	13.3	6.35	13.1	6.85
CESD-Post	.90	12.8	7.07	11.7	7.92
CPAQ-AE-Pre	.86	10.0	5.21	11.0	5.16
CPAQ-AE-Post	.87	10.4	4.86	11.3	5.71
CPAQ-PW-Pre	.76	7.6	4.42	8.5	4.31
CPAQ-PW-Post	.72	7.9	4.36	8.4	4.78
IIRS-Pre	.86	62.5	12.54	57.7	14.62
IIRS-Post	.87	61.0	11.79	60.2	14.39
Avg Pain-Pre	N/A	5.9	1.58	5.9	1.55
Avg Pain-Post	N/A	5.6	1.81	5.4	1.73
PCS-Pre	.94	22.3	12.49	19.5	11.29
PCS-Post	.95	21.9	12.98	19.7	12.37
SCS-Pre	.87	37.6	8.93	36.9	9.58
SCS-Post	.88	38.4	8.93	38.5	10.14
SE-Pre	.93	4.8	1.50	5.1	1.95
SE-Post	.94	4.8	1.74	5.2	2.14
PANAS-PA-Pre	.77-.87	10.8-11.5	4.00-4.23	10.3-11.0	3.45-3.79
PANAS-PA-Post	.85-.89	11.4-12.2	4.89-5.01	11.2-12.1	4.27-4.52
PANAS-NA-Pre	.86-.92	9.2-10.3	4.47-4.71	9.1-9.3	3.70-5.24
PANAS-NA-Post	.87-.91	9.3-10.1	4.29-4.65	8.37-9.44	3.31-5.44

Note. SWLS=Satisfaction with Life Scale; CESD=Center for Epidemiological Studies - Depression Scales; CPAQ-AE=Chronic Pain Acceptance Questionnaire-Activities Engagement subscale; CPAQ-PW=Chronic Pain Acceptance Questionnaire-Pain Willingness subscale; IIRS=Illness Intrusiveness Rating Scale; PCS=Pain Catastrophizing Scale; SCS=Self-Compassion Scale; SE=Chronic Pain Self-Efficacy Scale; PANAS-PA=Positive and Negative Affect Schedule-Positive Affect subscale; PANAS-NA=Positive and Negative Affect Schedule-Negative Affect subscale.

Table 3. *Correlations among the outcome variables*

	1	2	3	4	5	6	7	8
1.SWLS	-							
2.CESD	-.52**	-						
3.CPAQAE	.56**	-.61**	-					
4.CPAQPW	.38**	-.55**	.53**	-				
5.IIRS	-.45**	.45**	-.58**	-.61**	-			
6.Avg Pain	-.16	.45**	-.34**	-.41**	.43**	-		
7.PCS	-.45**	.76**	-.53**	-.61**	.42**	.46**	-	
8.SCS	.46**	-.68**	.50**	.43**	-.28**	-.28**	-.65**	-
9.SE	.55**	-.62**	.72**	.63**	-.54**	-.43**	-.62**	.49**

Note. SWLS=Satisfaction with Life Scale; CESD=Center for Epidemiological Studies - Depression Scales; CPAQ-AE=Chronic Pain Acceptance Questionnaire-Activities Engagement subscale; CPAQ-PW=Chronic Pain Acceptance Questionnaire-Pain Willingness subscale; IIRS=Illness Intrusiveness Rating Scale; PCS=Pain Catastrophizing Scale; SCS=Self-Compassion Scale; SE=Chronic Pain Self-Efficacy Scale.

* p<.05

**p<.01

Manipulation Check

All writing sessions were checked to see if participants closely adhered to the 20 minute writing time and the seven days in between writing sessions. A time stamp was collected when participants entered the writing session website and when they exited the website. Therefore, the time stamps can only provide a rough estimate for the amount of time spent writing, since participants may have may not have started writing directly after entering the website or may not have exited directly after completing the writing. In general, the average length of time between when participants entered and exited the writing website ranged from 33 to 36 minutes across writing sessions. Therefore, it appears that most participants adhered to the 20 minutes of actual writing. The average number of days in between writing sessions ranged from 6 to 8 days, indicating that most participants completed their writing

sessions approximately one week apart.

Research Question 1: Is there evidence that the manipulation (i.e., the two writing conditions) worked?

Hypothesis 1a: Participants in the self-compassion condition will report higher self-compassion at follow-up as compared to participants in the self-efficacy condition.

A two-way mixed ANCOVA was conducted for the outcome variable of self-compassion. Since self-compassion was measured before and after the intervention, these two time points served as the repeated measures variable. The two writing conditions served as the between-groups variable. There was a significant main effect for time ($F(1,86)=4.42, p<.05$) indicating that self-compassion scores increased regardless of writing condition (avg pre-score=37.24; avg post-score=38.65). The partial eta squared of .05 indicates that this was a medium effect. There was no significant main effect for writing condition ($F(1,85)=.52, p=.47$) and no significant interaction ($F(1,86)=.94, p=.33$). Therefore, self-compassion scores increased for both the self-compassion condition (avg pre-score=38.00; avg post-score=38.76) and the self-efficacy condition (avg pre-score=36.49; avg post-score=38.54; See Figure 1).

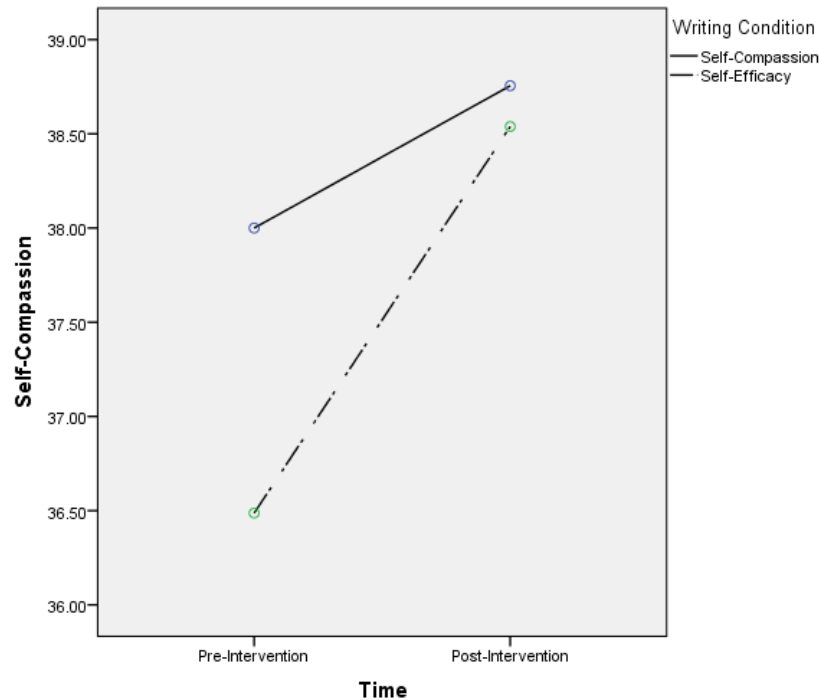


Figure 1. Average Self-Compassion Scale scores pre- and post-intervention for each writing condition.

Hypothesis 1b: Participants in the self-efficacy condition will report higher chronic pain self-efficacy at follow-up as compared to participants in the self-compassion condition.

A two-way mixed ANCOVA was conducted for the outcome variable of chronic pain self-efficacy. Since chronic pain self-efficacy was measured before and after the intervention, these two time points served as the repeated measures variable. The two writing conditions served as the between-groups variable. There was no significant main effect for time ($F(1,89)=.05$, $p=.82$) or writing condition ($F(1,88)=.09$, $p=.76$) and no significant interaction ($F(1,89)=.01$, $p=.93$). Results indicate that while self-efficacy scores did increase slightly for both the self-compassion condition (avg pre-score=4.76; avg post-score=4.77) and the self-efficacy

condition (avg pre-score=4.96; avg post-score=5.00), these increases were not significant.

Hypothesis 1c: An independent rater's categorization of writing conditions will demonstrate adequate agreement with the actual writing condition categorization.

A rater, who was not familiar with the study, read half of the essays from each of the three writing sessions for the self-efficacy condition (63 essays) and half for the self-compassion condition (75 essays). These essays were randomly selected using a random number generator. The rater read the instructions for each condition and then categorized each essay based on which writing condition she thought the participant was assigned to. Overall, 73.7% of the essays were correctly classified. The agreement between the rater's categorization and the actual group category was calculated. The resulting Kappa was .47 (Std Error=.08), which indicates moderate agreement (Landis & Koch, 1977). A chi-square analysis revealed that there was no difference between writing conditions for correctly and incorrectly classified participants ($\chi^2=.29$, $p=.78$). Moreover, independent samples t-tests were conducted between correctly and incorrectly classified participants and all outcome variables. Results indicate that there were no differences between correctly and incorrectly classified participants for any of the outcome variables.

Hypothesis 1d: Participants in the self-compassion condition will display greater use of first-person plural pronouns as compared to those in the self-efficacy condition.

The Linguistic Inquiry and Word Count (LIWC; Pennebaker, Francis, & Booth, 2001) was used to calculate the percentage of total words that fell into the

category of first-person plural pronouns (e.g., we, us, our) for each writing sample. An independent t-test was run to test the differences between the two writing conditions in terms of the mean percentage of this word category. There was no significant difference in average percentage of first-person plural pronouns ($t_{91}=-.54$, $p=.59$) for the self-compassion (avg=.20, SD=.45) and the self-efficacy condition (avg=.26, SD=.54). Therefore, the hypothesis was not supported.

Hypothesis 1e: Participants in the self-compassion condition will display fewer first-person singular pronouns as compared to those in the self-efficacy condition.

The LIWC was also used to calculate the percentage of total words that fell into the category of first-person singular pronouns (e.g., I, me, mine) for each writing sample. An independent t-test was run to test the differences between the two writing conditions in terms of the mean percentage of this word category. The Levene's Test for equality of variances was significant ($F=4.82$, $p<.05$), therefore equal variances were not assumed. The self-compassion condition produced a significantly greater average percentage ($t_{88.4}=2.02$, $p<.05$) of first-person singular pronouns (avg=10.06, SD=1.96) than the self-efficacy condition (avg=9.35, SD=1.41). This finding is the opposite of what was predicted by the hypothesis.

General Analytic Strategy

Research Question 2: Will participants report improvements in their physical well-being at follow-up?

Research Question 2a: Will participants in both the self-compassion and self-efficacy conditions report an increase in the Chronic Pain Acceptance Questionnaire -

Pain Willingness subscale?

A two-way mixed ANCOVA was conducted with pain willingness as the outcome variable. The pre- and post- measurement time points served as the repeated measures variable and the two writing conditions served as the between-groups variable. There were no significant main effects for time ($F(1,87)=.61$, $p=.44$) or writing condition ($F(1,86)=.33$, $p=.57$) and no significant interaction ($F(1,87)=.91$, $p=.34$). Results indicate that pain willingness scores increased for the self-compassion condition (avg pre-score=7.19; avg post-score=7.69) and decreased slightly for the self-efficacy condition (avg pre-score=8.05; avg post-score=8.00), however, neither of these changes were significant.

Research Question 2b: Will participants in both the self-compassion and self-efficacy conditions report an increase in the Chronic Pain Acceptance Questionnaire - Activity Engagement subscale?

A two-way mixed ANCOVA was conducted with activity engagement as the outcome variable. The pre- and post- measurement time points served as the repeated measures variable and the two writing conditions served as the between-groups variable. There were no significant main effects for time ($F(1,86)=.29$, $p=.59$) or writing condition ($F(1,85)=.001$, $p=.99$) and no significant interaction ($F(1,86)=.17$, $p=.68$). Results indicate that while activity engagement scores did increase slightly for both the self-compassion (avg pre-score=10.13; avg post-score=10.51) and the self-efficacy condition (avg pre-score=10.73; avg post-score=10.78), these increases were not significant.

Research Question 2c: Will participants in both the self-compassion and self-

efficacy conditions report a decrease in illness intrusiveness?

A two-way mixed ANCOVA was conducted with illness intrusiveness as the outcome variable. The pre- and post- measurement time points served as the repeated measures variable and the two writing conditions served as the between-groups variable. There was no significant main effect for time ($F(1,87)=.12, p=.74$) or writing condition ($F(1,86)=.39, p=.53$). However, there was a significant interaction between time and writing condition ($F(1,87)=6.53, p<.05$), where illness intrusiveness scores decreased for the self-compassion condition (avg pre-score=63.50; avg post-score=61.52) and increased for the self-efficacy condition (avg pre-score=59.32; avg post-score=61.90; See Figure 2). The partial eta squared of .07 indicates that this was a medium effect.

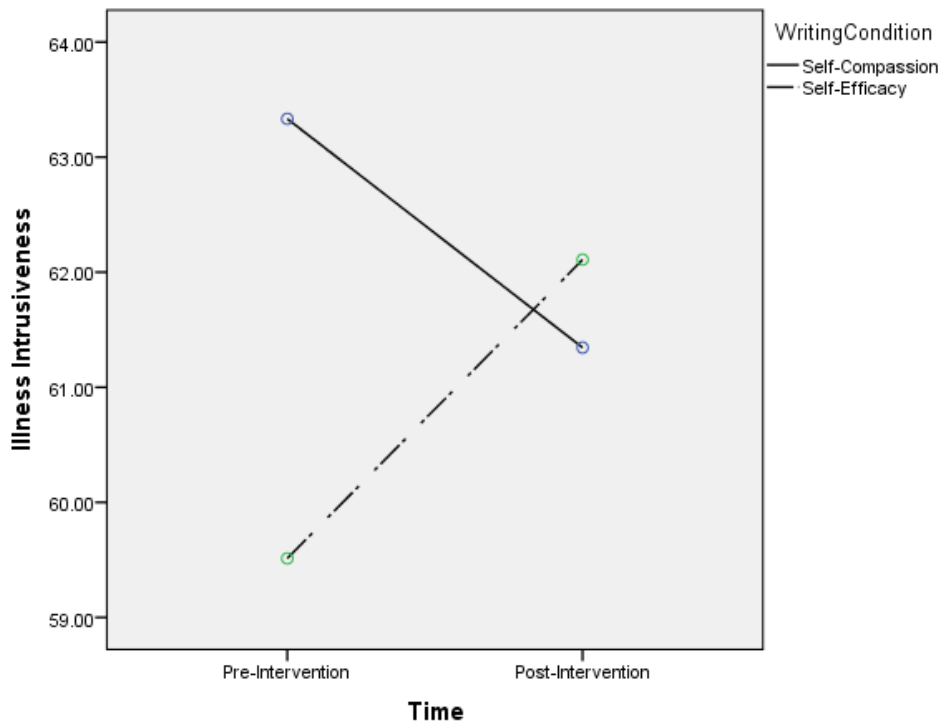


Figure 2. Average Illness Intrusiveness Rating Scale scores pre- and post-intervention for each writing condition.

Research Question 2d: Will participants in both the self-compassion and self-efficacy conditions report a decrease in pain severity?

A two-way mixed ANCOVA was conducted with average pain severity as the outcome variable. The pre- and post- measurement time points served as the repeated measures variable and the two writing conditions served as the between-groups variable. There was a significant main effect for time ($F(1,91)=7.01$, $p<.01$) and the partial eta squared of .07 indicates that this is a medium effect. However, there was no significant main effect for writing condition ($F(1,90)=.33$, $p=.57$) and no significant interaction between time and writing condition ($F(1,91)=.11$, $p=.74$). This indicates that while the average pain that participants reported experiencing decreased significantly after the interventions (avg pre-score=5.90; avg post-score=5.49), there was no significant difference between the self-compassion (avg pre-score=5.94; avg post-score=5.58) and the self-efficacy conditions (avg pre-score=5.86; avg post-score=5.40; See Figure 3).

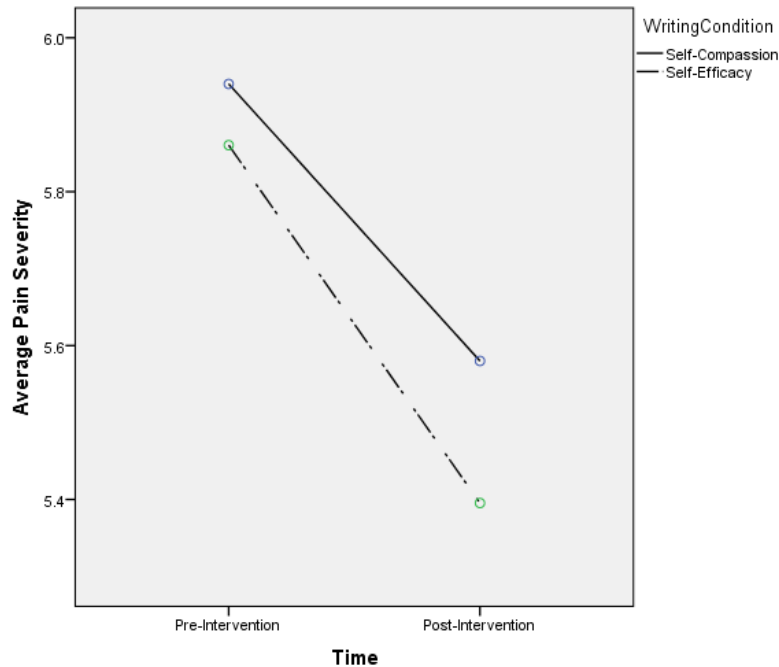


Figure 3. Average pain scores pre- and post-intervention for each writing condition.

Research Question 3: Will participants report improvements in their psychological well-being at follow-up?

Research Question 3a: Will participants in both the self-compassion and self-efficacy conditions report an increase in life satisfaction?

A two-way mixed ANCOVA was conducted with life satisfaction as the outcome variable. The pre- and post- measurement time points served as the repeated measures variable and the two writing conditions served as the between-groups variable. There was a significant main effect for writing condition ($F(1,87)=3.89$, $p=.05$), where life satisfaction scores were significantly higher for the self-efficacy condition ($avg=16.48$) than the self-compassion condition ($avg=12.93$). The partial eta squared of .04 indicates that this was a small to medium effect. However, there was no significant main effect for time ($F(1,88)=2.58$, $p=.11$) and no significant interaction between time and writing condition ($F(1,88)=2.27$, $p=.14$). Thus, while the

average life satisfaction scores increased after the intervention for both the self-compassion (avg pre-score=12.17; avg post-score=13.69) and the self-efficacy condition (avg pre-score=16.45; avg post-score=16.50), this increase was not significant (See Figure 4).

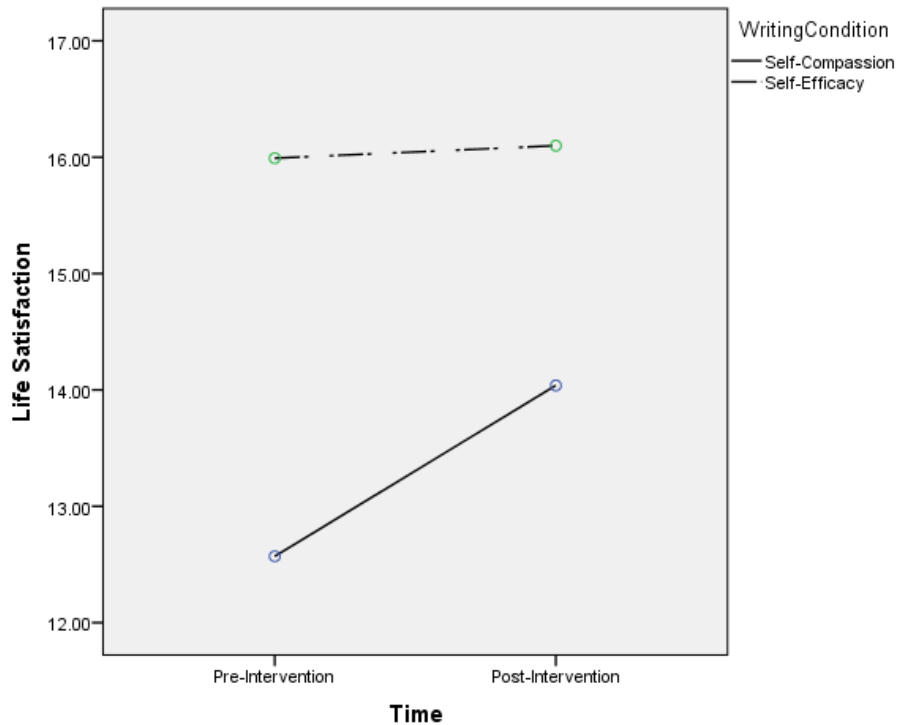


Figure 4. Average Satisfaction with Life scores pre- and post-intervention for each writing condition.

Research Question 3b: Will participants in both the self-compassion and self-efficacy conditions report a decrease in depression symptoms?

A two-way mixed ANCOVA was conducted with depression symptoms as the outcome variable. The pre- and post- measurement time points served as the repeated measures variable and the two writing conditions served as the between-groups variable. There were no significant main effects for time ($F(1,89)=3.62, p=.06$) or

writing condition ($F(1,88)=.00$, $p=.99$) and there was no significant interaction ($F(1,89)=.94$, $p=.34$). However, the p-value of .06 for time indicates that there was a trend towards a decrease in reported depression symptoms after the intervention, regardless of condition. The partial eta squared of .04 indicates that this was a small-medium effect. Results indicate that depression scores decreased for both the self-compassion (avg pre-score=13.00; avg post-score=12.49) and the self-efficacy conditions (avg pre-score=12.81; avg post-score=11.24; See Figure 5).

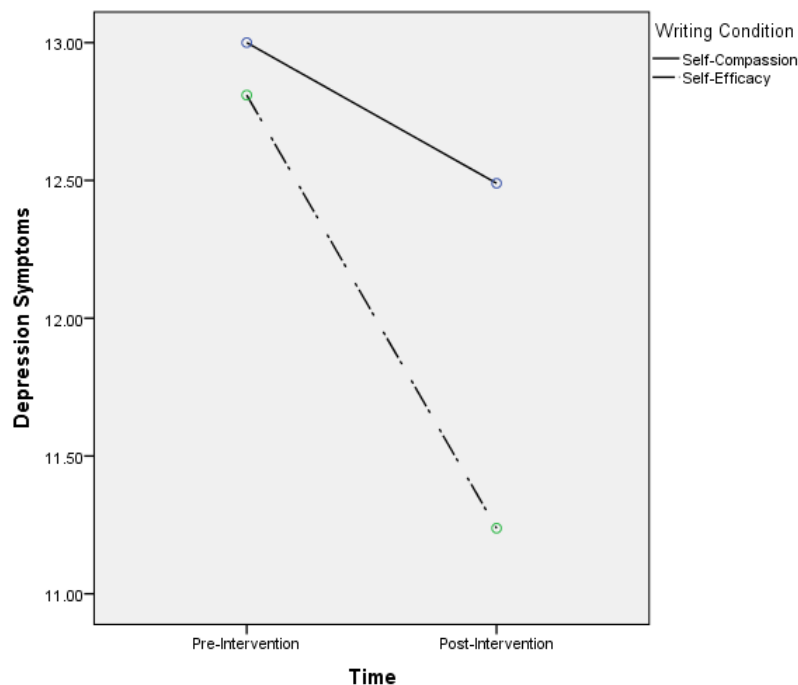


Figure 5. Average depression scores pre- and post-intervention for each writing condition.

Research Question 4: Will participants' affect change over the course of the three writing sessions for the self-compassion and self-efficacy conditions?

Research Question 4a: Will participants' positive affect change over the course of the three writing sessions for the self-compassion and self-efficacy conditions?

A two-way mixed ANCOVA was conducted for the outcome variable of positive affect. Positive affect was measured directly before and after each of the three writing sessions and therefore these six time points served as the repeated measures variable. The two writing conditions served as the between-groups variable. Mauchley's test of sphericity was significant ($W=.37$, $p<.001$) indicating that the sphericity assumption was violated. Therefore, a Huynh-Feldt correction was used. Results indicate that there was a significant main effect for reported positive affect over the course of the three writing sessions ($F(3.9, 316.6)=3.94$, $p<.01$). The partial eta squared of .05 indicates that this is a medium effect. Bonferroni corrected post hoc tests showed that positive affect scores directly after writing session 1 (avg=11.44) were significantly higher than positive affect scores directly before writing session 2 (avg=9.80; $p<.01$) and that positive affect scores increased significantly directly after writing session 2 (avg=10.81; $p=.05$). This indicates that participants reported the highest level of positive affect directly after the first writing session and that positive affect scores declined over the course of the week in between writing sessions 1 and 2. However, participants reported the biggest increase in positive affect after writing session 2. There was a non-significant main effect of writing condition ($F(1,80)=.02$, $p=.90$) and a non-significant interaction between writing condition and positive affect over time ($F(3.9, 316.)=.14$, $p=.97$; See Figure 6).

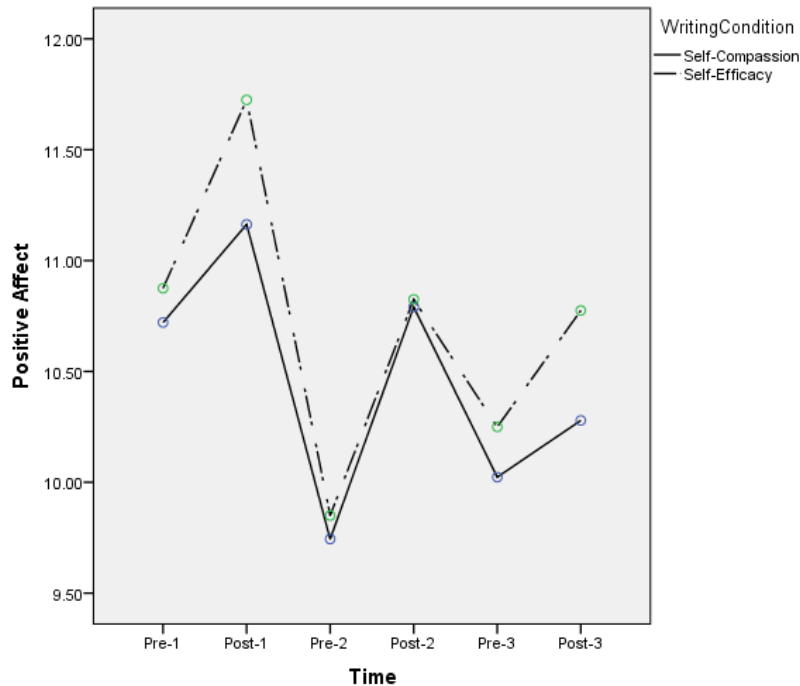


Figure 6. Average PANAS Positive Affect scores across writing sessions for each writing condition.

Research Question 4b: Will participants' negative affect change over the course of the three writing sessions for the self-compassion and self-efficacy conditions?

A two-way mixed ANCOVA was conducted for the outcome variable of negative affect. Negative affect was measured directly before and after each of the three writing sessions and therefore these six time points served as the repeated measures variable. The two writing conditions served as the between-groups variable. Mauchley's test of sphericity was significant ($W=.44$, $p<.001$) indicating that the sphericity assumption was violated. Therefore, a Huynh-Feldt correction was used. Results indicate that there was a non-significant main effect for negative affect over the three writing sessions ($F(4.1, 326.2)=1.25$, $p=.29$) and a non-significant main effect of writing condition ($F(1,79)=2.34$, $p=.13$) and a non-significant interaction

between writing condition and negative affect over time ($F(4.1, 326.2)=.30, p=.88$; See Figure 7).

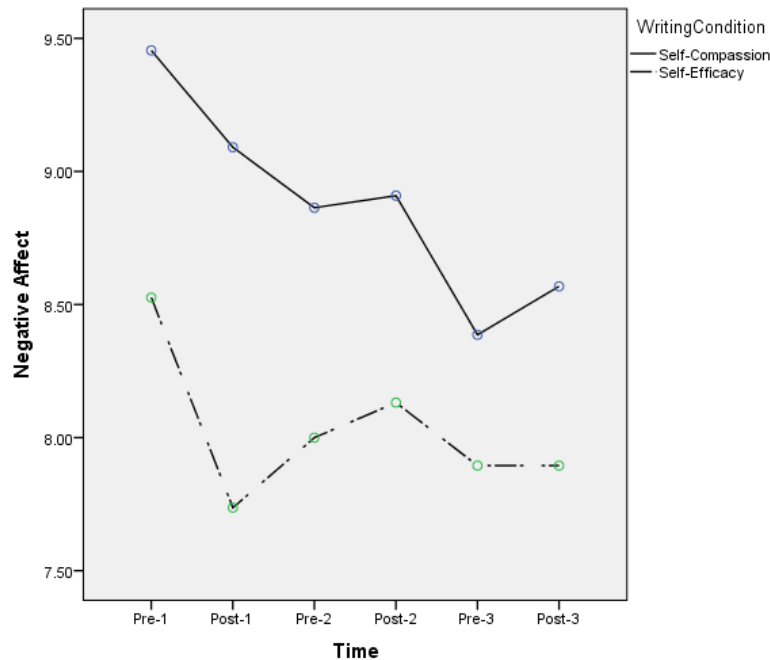


Figure 7. Average PANAS Negative Affect scores across writing sessions for each writing condition.

Research Question 5:

Will participants' subjective evaluations over the course of the three writing sessions differ for the self-compassion and self-efficacy conditions?

The questions used to evaluate participants' subjective evaluations of the writing exercise are typically asked in expressive writing studies to assess engagement in the writing (Pennebaker & Beall, 1986). Participants rated their answers on a Likert-type scale (1=not at all, 7=a great deal). Two-way mixed ANOVAs were conducted separately for each of the six subjective evaluations. The subjective evaluations were measured directly after each of the three writing sessions and therefore these three time points served as the repeated measures variable. The

two writing conditions served as the between-groups variable. Mauchley's test of sphericity was significant for the subjective evaluations of the emotional level of essays ($W=.93$, $p<.05$) and the effect of writing on managing pain ($W=.92$, $p<.05$), indicating that the sphericity assumption was violated. Therefore, a Huynh-Feldt correction was used for these outcome variables.

Research Question 5a: Will participants in the self-compassion condition rate their essays as more personal as compared to those in the self-efficacy condition?

There were no significant main effects for time ($F(2, 182)=.09$, $p=.92$) or writing condition ($F(1,91)=.03$, $p=.87$) on ratings of the personal level of the essays. In addition, there was no significant interaction between time and writing condition ($F(2, 182)=.18$, $p=.84$). Results indicate that the overall average rating of the personal level of the essays was high across the three writing sessions ($W1=6.18$; $W2=6.12$; $W3=6.15$), as well as for the self-compassion ($W1=6.24$; $W2=6.10$; $W3=6.16$) and the self-efficacy conditions ($W1=6.12$; $W2=6.14$; $W3=6.14$) separately.

Research Question 5b: Will participants in the self-compassion condition rate their essays as more emotional as compared to those in the self-efficacy condition?

There were no significant main effects for time ($F(1.9, 175.5)=1.67$, $p=.19$) or writing condition ($F(1,91)=1.09$, $p=.30$) on ratings of the emotional level of the essays. In addition, there was no significant interaction between time and writing condition ($F(1.9, 175.5)=1.62$, $p=.20$). Results indicate that the overall average rating of the emotional level of the essays was high across the three writing times ($W1=5.61$; $W2=5.82$; $W3=5.85$), as well as for the self-compassion ($W1=5.76$; $W2=6.04$; $W3=5.82$) and the self-efficacy conditions ($W1=5.47$; $W2=5.61$; $W3=5.88$)

separately.

Research Question 5c: Will participants in the self-efficacy condition report that writing has affected how they think about their pain more as compared to those in the self-compassion condition?

There were no significant main effects for time ($F(2, 182)=.56, p=.57$) or writing condition ($F(1,91)=.32, p=.57$) on the effect of writing on thinking about pain. In addition, there was no significant interaction between time and writing condition ($F(2, 182)=.99, p=.38$). Results indicate that there was a moderate overall average rating for the extent that writing affected how they think about their pain across the three writing times ($W1=4.44$; $W2=4.63$; $W3=4.52$), as well as for the self-compassion ($W1=4.32$; $W2=4.68$; $W3=4.32$) and the self-efficacy conditions ($W1=4.56$; $W2=4.58$; $W3=4.72$) separately.

Research Question 5d: Will participants in the self-compassion condition report greater improvement in how they feel about their pain as compared to those in the self-efficacy condition?

There were no significant main effects for time ($F(2, 182)=.11, p=.90$) or writing condition ($F(1,91)=.09, p=.77$) on the effect of writing on feelings about pain. In addition, there was no significant interaction between time and writing condition ($F(2, 182)=.74, p=.48$). Results indicate that there was a moderate overall average rating for the extent that writing improved how they feel about their pain across the three writing times ($W1=4.00$; $W2=4.07$; $W3=3.98$), as well as for the self-compassion ($W1=3.82$; $W2=4.06$; $W3=4.02$) and the self-efficacy conditions ($W1=4.19$; $W2=4.07$; $W3=3.93$) separately.

Research Question 5e: Will participants in the self-compassion condition report feeling more understood and accepting of their pain experiences as compared to those in the self-efficacy condition?

There were no significant main effects for time ($F(2, 182)=.12, p=.88$) or writing condition ($F(1,91)=.02, p=.88$) on the effect of writing on acceptance of pain. In addition, there was no significant interaction between time and writing condition ($F(2, 182)=1.44, p=.24$). Results indicate that there was a moderate overall average rating of the extent that writing made them feel more understood and accepting of their pain across the three writing times ($W1=4.04$; $W2=4.07$; $W3=4.13$), as well as for the self-compassion ($W1=3.84$; $W2=4.06$; $W3=4.26$) and the self-efficacy conditions ($W1=4.23$; $W2=4.07$; $W3=4.00$) separately.

Research Question 5f: Will participants in the self-efficacy condition report feeling more confident about managing their pain as compared to those in the self-compassion condition?

There were no significant main effects for time ($F(1.9, 172.9)=.89, p=.41$) or writing condition ($F(1,91)=.04, p=.84$) on the effect of writing on managing pain. In addition, there was no significant interaction between time and writing condition ($F(1.9, 172.9)=.18, p=.83$). Results indicate that there was a moderate overall average rating of the extent that writing made them feel more confident about managing their pain across the three writing times ($W1=3.79$; $W2=3.92$; $W3=3.65$), as well as for the self-compassion ($W1=3.70$; $W2=3.88$; $W3=3.68$) and the self-efficacy conditions ($W1=3.88$; $W2=3.95$; $W3=3.63$) separately.

Research Question 6: Does pain catastrophizing moderate the effectiveness of the two

writing conditions?

A moderated multiple regression analysis was used to test pain catastrophizing as a potential moderator on the effect of the intervention on six outcome variables (pain willingness, activities engagement, illness intrusiveness, illness severity, life satisfaction, and depression symptoms). The dichotomous intervention variable (1=self-compassion writing, 0=self-efficacy) was coded based on a dummy coding system since we were interested in comparing the means of the two groups (West, Aiken, & Krull, 1996). Self-efficacy was coded as 0 since it served as the comparison group to the self-compassion writing condition. The moderator variable of pain catastrophizing was standardized by converting raw scores to z-scores which served to reduce the multicollinearity that often occurs when predictor and moderator variables are included in analyses with the interaction term (Cohen, Cohen, West, & Aiken, 2003). Multiple regression analysis was chosen, as opposed to analysis of variance, in order to retain the continuous nature of the pain catastrophizing scale and the baseline scores of the dependent variables, and since creating artificial groups would reduce the power to detect interactions (Aiken & West, 1991; Frazier, Tix, & Barron, 2004).

Separate hierarchical regression analyses were conducted for each outcome variable. In the first step of the regression equation, the pre-intervention score of the outcome variable of interest was entered along with employment in order to control for baseline scores. In the second step, the dichotomous intervention variable was entered along with the pain catastrophizing scores. Finally, in the third step, the interaction between the intervention and pain catastrophizing scores was entered in

order to test whether pain catastrophizing scores moderate the relationship between the intervention and the outcome variable. The interaction scores were calculated by multiplying pain catastrophizing scores with the dichotomous intervention variable.

Research Question 6a: Will participants who score higher on pain catastrophizing report higher scores on the pain willingness subscale of the Chronic Pain Acceptance Questionnaire in the self-compassion condition as compared to the self-efficacy condition?

As indicated by Table 4, the interaction term did not account for significant, unique variance in the prediction of reported pain willingness after controlling for pretest pain willingness scores and employment.

Table 4. *Hierarchical moderated multiple regression predicting post-intervention pain willingness*

	Predictors	<i>R</i>	ΔR^2	<i>df</i>	ΔF	β^*	<i>p</i>
Step 1	CPAQ-PW-pre	.78	.61	82	63.85**	.78	.00**
	Employment					-.01	.89
Step 2	CPAQ-PW-pre	.78	.01	80	.64	.76	.00**
	Employment					-.00	.96
	Condition					.06	.40
	PCS-pre					-.06	.44
Step 3	CPAQ-PW-pre	.78	.00	79	.02	.76	.00**
	Employment					-.00	.96
	Condition					.06	.41
	PCS-pre					-.05	.65
	Condition x PCS					-.15	.88

Note. CPAQ-PW=Chronic Pain Acceptance Questionnaire-Pain Willingness subscale; Condition=writing condition; PCS=Pain Catastrophizing Scale

* $p < .05$

** $p < .001$

Research Question 6b: Will participants who score higher on pain catastrophizing report higher scores on the activities engagement subscale of the Chronic Pain Acceptance Questionnaire in the self-compassion condition as compared to the self-efficacy condition?

As indicated by Table 5, the interaction term accounted for significant, unique variance in the prediction of reported activities engagement after controlling for pretest pain activities engagement scores and employment. The interaction term had a medium effect size. In order to determine the nature of the interaction, pain catastrophizing scores were divided into three categories (low, moderate, and high) based on Sullivan et al.'s (1995) cut-offs for clinically relevant levels of catastrophizing. The cut-off scores that corresponded to each category were as follows: low catastrophizing (total scores=1-19); moderate catastrophizing (total scores=20-29), high catastrophizing (total scores=30-52). Then, a line graph was created (see Figure 8) comparing these categories on activities engagement scores and separate lines were used for each writing condition. The means for the activities engagement scale used in the graph were adjusted to account for the pre-intervention scores and employment. According to Figure 8, participants who scored high in pain catastrophizing reported higher activity engagement after the self-efficacy intervention, but lower activity engagement after the self-compassion intervention.

Table 5. *Hierarchical moderated multiple regression predicting post-intervention activities engagement*

	Predictors	<i>R</i>	ΔR^2	<i>df</i>	ΔF	β^*	<i>P</i>
Step 1	CPAQ-AE-pre	.72	.52	81	44.33**	.74	.00**
	Employment					-.06	.50
Step 2	CPAQ-AE-pre	.72	.00	79	.10	.73	.00**
	Employment					-.05	.57
	Condition					.03	.66
	PCS-pre					-.03	.72
Step 3	CPAQ-AE-pre	.74	.02	78	3.87*	.73	.00**
	Employment					-.04	.66
	Condition					.01	.88
	PCS-pre					.14	.25
	Condition x PCS					-.22	.05*

Note. CPAQ-AE=Chronic Pain Acceptance Questionnaire-Activities Engagement subscale; Condition=writing condition; PCS=Pain Catastrophizing Scale

* $p < .05$

** $p < .001$

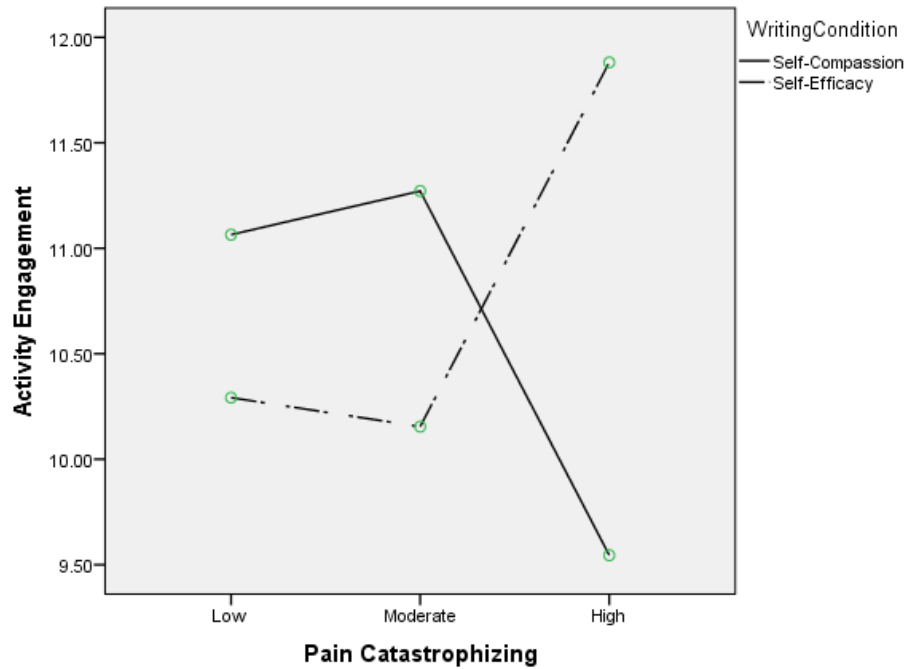


Figure 8. Interaction between pain catastrophizing and writing condition predicting activities engagement scores

Research Question 6c: Will participants who score higher on pain catastrophizing report lower illness intrusiveness in the self-compassion condition as compared to the self-efficacy condition?

As indicated by Table 6, the interaction term did not account for significant, unique variance in the prediction of reported illness intrusiveness after controlling for pretest illness intrusiveness scores and employment.

Table 6. *Hierarchical moderated multiple regression predicting post-intervention illness intrusiveness*

	Predictors	<i>R</i>	ΔR^2	<i>df</i>	ΔF	β^*	<i>P</i>
Step 1	IIRS-pre	.74	.55	83	50.02**	.74	.00**
	Employment					-.01	.92
Step 2	IIRS-pre	.75	.02	81	2.12	.73	.00**
	Employment					-.03	.72
	Condition					-.13	.08
Step 3	PCS-pre					.08	.34
	IIRS-pre	.75	.00	80	.03	.72	.00**
	Employment					-.03	.71
	Condition					-.13	.09
	PCS-pre					.06	.59
	Condition x PCS					.02	.86

Note. IIRS=Illness Intrusiveness Rating Scale; Condition=writing condition; PCS=Pain Catastrophizing Scale

* $p < .05$

** $p < .001$

Research Question 6d: Will participants who score higher on pain catastrophizing report lower pain severity in the self-compassion condition as compared to the self-efficacy condition?

As indicated by Table 7, the interaction term did not account for significance, unique variance in the prediction of average pain scores after controlling for pretest average pain scores and employment.

Table 7. *Hierarchical moderated multiple regression predicting post-intervention average pain severity*

	Predictors	<i>R</i>	ΔR^2	<i>df</i>	ΔF	β^*	<i>P</i>
Step 1	Avg Pain-pre	.63	.39	86	27.94**	.63	.00**
	Employment					.00	.99
Step 2	Avg Pain-pre	.63	.01	84	.34	.60	.00**
	Employment					.02	.87
	Condition					.01	.95
Step 3	PCS-pre					.08	.42
	Avg Pain-pre	.64	.01	83	1.61	.60	.00**
	Employment					.03	.78
	Condition					-.01	.95
	PCS-pre					.20	.14
	Condition x PCS					-.16	.21

Note. Avg Pain-pre=Average Pain Severity; Condition=writing condition; PCS=Pain Catastrophizing Scale

* $p < .05$

** $p < .001$

Research Question 6e: Will participants who score higher on pain catastrophizing report higher life satisfaction in the self-compassion condition as compared to the self-efficacy condition?

As shown in Table 8, the interaction term did not account for significance, unique variance in the prediction of reported life satisfaction after controlling for pretest life satisfaction scores and employment.

Table 8. *Hierarchical moderated multiple regression predicting post-intervention life satisfaction*

	Predictors	<i>R</i>	ΔR^2	<i>df</i>	ΔF	β^*	<i>P</i>
Step 1	SWLS-pre	.79	.62	84	68.92**	.79	.00**
	Employment					.01	.92
Step 2	SWLS-pre	.79	.00	82	.36	.78	.00**
	Employment					.02	.82
	Condition					.05	.53
	PCS-pre					-.04	.60
Step 3	SWLS-pre	.79	.00	81	.01	.78	.00**
	Employment					.02	.84
	Condition					.05	.53
	PCS-pre					-.05	.65
	Condition x PCS					.01	.92

Note. SWLS=Satisfaction with Life Scale; Condition=writing condition; PCS=Pain Catastrophizing Scale

* $p < .05$

** $p < .001$

Research Question 6f: Will participants who score higher on pain catastrophizing report fewer depression symptoms in the self-compassion condition as compared to the self-efficacy condition?

As shown in Table 9, the interaction term did not account for significance, unique variance in the prediction of reported depression symptoms after controlling for pretest depression scores and employment.

Table 9. *Hierarchical moderated multiple regression predicting post-intervention depression symptoms*

	Predictors	<i>R</i>	ΔR^2	<i>df</i>	ΔF	β^*	<i>P</i>
Step 1	CESD-pre	.70	.49	84	40.56**	.68	.00**
	Employment					-.07	.43
Step 2	CESD –pre	.71	.01	82	.78	.75	.00**
	Employment					-.05	.51
	Condition					.05	.51
	PCS-pre					-.11	.27
Step 3	CESD –pre	.71	.00	81	.50	.74	.00**
	Employment					-.05	.55
	Condition					.06	.46
	PCS-pre					-.17	.19
	Condition x PCS					.08	.48

Note. CESD= Center for Epidemiological Studies - Depression Scales; Condition=writing condition; PCS=Pain Catastrophizing Scale

* $p < .05$

** $p < .001$

Additional Analyses

Participants' Experience in the Study

Will there be a difference in the follow-up questions about the essay writing for the self-compassion and the self-efficacy conditions?

Participants were asked five follow-up questions regarding their perception of the essay writing after completing the intervention. They rated their answers on a Likert-type scale (1=not at all, 7=a great deal). Questions such as these are typically asked in studies using the writing paradigm since they provide an idea of how engaged participants were in the task (Pennebaker & Beall, 1986). Therefore, these questions serve as a manipulation check not of the specific condition, but of the writing paradigm in general. The two conditions were compared to each other to ensure that participants were engaged in both types of writing. Independent samples t-

tests were conducted for each individual question to determine if there was a difference between the self-compassion and self-efficacy conditions. The follow-up questions included:

1. Prior to this study, to what extent had you discussed some of the things you wrote about?

There was no significant difference in terms of how much participants reported that they had disclosed prior to the study between the self-compassion (avg=4.66) and self-efficacy (avg=4.05) conditions ($t_{91}=1.47$, $p=.15$).

2. Between writing sessions, to what extent did you discuss some of the things you wrote about with others?

There was no significant difference in terms of how much participants reported that they had discussed their essays with others between the self-compassion (avg=3.30) and self-efficacy (avg=3.00) conditions ($t_{91}=.67$, $p=.50$).

3. To what extent do significant others in your life understand what it is like for you to be in pain?

There was no significant difference in terms of how much participants reported that significant others understood participants' pain between the self-compassion (avg=4.20) and self-efficacy (avg=4.26) conditions ($t_{91}=-.14$, $p=.88$).

4. How helpful did you find the writing sessions?

There was no significant difference in terms of how helpful participants reported that they found the writing sessions between the self-compassion (avg=4.56) and self-efficacy (avg=4.65) conditions ($t_{91}=-.24$, $p=.81$).

5. How likely would you be to do this type of writing on your own?

There was no significant difference in terms of how likely participants reported that they would be to do this writing on their own between the self-compassion (avg=4.34) and self-efficacy (avg=3.91) conditions ($t_{91}=.98$, $p=.33$).

Examining Changes in Self-Compassion and Self-Efficacy

We decided to conduct additional analyses exploring whether changes in reported self-compassion or self-efficacy during the writing intervention influenced psychological and physical well-being. These additional analyses were conducted for several reasons. First, the manipulation checks indicated that there were no robust differences between the two writing conditions. Therefore, it made sense to explore underlying mechanisms that may be present in both interventions. Second, both writing conditions produced a significant increase in reported self-compassion, suggesting that both interventions produced similar beneficial effects. Third, relatively little is known about the underlying mechanisms that make expressive writing effective and the literature has called for more research in this area (Pennebaker, 2004).

We conducted separate multiple regression analyses for each of the six outcome variables (pain willingness, activities engagement, illness intrusiveness, illness severity, life satisfaction, and depression symptoms). We calculated changes in reported self-compassion and self-efficacy by subtracting the pre-intervention scores from the post-intervention scores. Separate regression analyses were conducted for changes in reported self-compassion and changes in reported self-efficacy so that the effects of one did not confound the effects of the other. These scores were entered as

predictors along with the pre-intervention score of the outcome variable of interest to control for baseline scores.

As shown in Table 10, changes in self-compassion scores significantly predicted illness intrusiveness, activity engagement, and depression symptom scores. Specifically a one point increase in reported self-compassion decreased illness intrusiveness scores by .33 points, increased activity engagement scores by .16 points, and decreased depressive symptom scores by .39 points, after controlling for pre-intervention scores.

Table 10. *Multiple regression with changes in self-compassion as a predictor*

Outcome	Predictors	<i>R</i>	<i>R</i> ²	<i>df</i>	<i>F</i>	β	<i>P</i>
IIRS	IIRS-pre	.76	.57	82	54.67**	.70	.00**
	SCS change					-.33	.02*
CPAQ-PW	CPAQ-PW-pre	.78	.61	81	63.69**	.85	.00**
	SCS change					.09	.06
CPAQ-AE	CPAQ-AE-pre	.72	.52	81	.43.52**	.68	.00**
	SCS change					.16	.01**
AvgPain	AvgPain-pre	.62	.38	85	25.80**	.69	.00**
	SCS change					-.03	.21
SWLS	SWLS-pre	.79	.62	82	66.78**	.79	.00**
	SCS change					.09	.25
CESD	CESD-pre	.76	.57	83	55.66**	.77	.00**
	SCS change					-.39	.00**

Note. IIRS=Illness Intrusiveness Rating Scale; CPAQ-PW=Chronic Pain Acceptance Questionnaire-Pain Willingness subscale; CPAQ-AE=Chronic Pain Acceptance Questionnaire-Activity Engagement subscale; AvgPain=Average Pain Severity; SWLS=Satisfaction with Life Scale; CESD= Center for Epidemiological Studies - Depression Scales; SCS=Self-Compassion Scale.

* $p < .05$, ** $p < .01$

As shown in Table 11, changes in average levels of reported self-efficacy significantly predicted all outcome variables, including illness intrusiveness, pain willingness, activity engagement, average pain severity, life satisfaction, and

depression symptom scores. Specifically a one point increase in average reported self-efficacy levels decreased illness intrusiveness scores by 1.60 points, increased pain willingness scores by .90 points, increased activity engagement scores by .98 points, decreased pain severity scores by .34 points, increased life satisfaction scores by 1.36 points, and decreased depressive symptom scores by 1.49 points, after controlling for pre-intervention scores.

Table 11. *Multiple regression with changes in average levels of self-efficacy as a predictor*

Outcome	Predictors	<i>R</i>	<i>R</i> ²	<i>df</i>	<i>F</i>	β	<i>P</i>
IIRS	IIRS-pre	.76	.57	85	57.31**	.65	.00**
	SE change					-1.60	.04*
CPAQ-PW	CPAQ-PW-pre	.83	.69	85	95.27**	.86	.00**
	SE change					.90	.00**
CPAQ-AE	CPAQ-AE-pre	.74	.55	85	52.77**	.70	.00**
	SE change					.98	.00**
AvgPain	AvgPain-pre	.62	.38	88	27.34**	.57	.00**
	SE change					-.34	.01**
SWLS	SWLS-pre	.81	.65	85	78.73**	.77	.00**
	SE change					1.36	.00**
CESD	CESD-pre	.74	.54	86	50.47**	.74	.00**
	SE change					-1.49	.00**

Note. IIRS=Illness Intrusiveness Rating Scale; CPAQ-PW=Chronic Pain Acceptance Questionnaire-Pain Willingness subscale; CPAQ-AE=Chronic Pain Acceptance Questionnaire-Activity Engagement subscale; AvgPain=Average Pain Severity; SWLS=Satisfaction with Life Scale; CESD= Center for Epidemiological Studies - Depression Scales; SE=Chronic Pain Self-Efficacy Scale

* $p < .05$, ** $p < .01$

Content of the Essays

None of the hypotheses regarding the manipulation checks for the two writing conditions were robustly supported. Therefore, we decided to further explore differences between the two conditions by analyzing the content of the essays using the Linguistic Inquiry and Word Count (LIWC; Pennebaker et al., 2001). The LIWC

calculates the percentage of words that fall within a number of different word categories. We chose to analyze word categories that seemed relevant to the expressive writing paradigm, including social process words (e.g., they, child, mate, talk), cognitive process words (e.g., cause, know, ought), insight words (e.g., think, know, consider), positive emotion words (e.g., love, nice, sweet), and negative emotion words (e.g., hurt, ugly, nasty). Independent t-tests were run to test the differences between the two writing conditions in terms of the mean percentage of these word categories. The Levene's Test for equality of variances was significant for the positive emotion category ($F=5.20, p<.05$) and insight words category ($F=4.32, p<.05$), therefore equal variances were not assumed for these analyses.

Results indicate that the self-compassion condition produced a significantly greater average percentage of social process words (e.g., they, child, mate, talk) and positive emotion words than the self-efficacy condition (see Table 12). The Cohen's d of .48 and .53, respectively, indicate that these were medium effects. Conversely, there was no significant difference between the two conditions in terms of the average percentage of cognitive process words, insight words, or negative emotion words.

Table 12. *T-tests of the mean differences in percentage of word use between the two writing conditions*

Category of words	Self-Compassion Condition		Self-Efficacy Condition		t-value	Cohen's d
	Mean	SD	Mean	SD		
Positive emotion	3.32	.96	2.86	.77	2.56*	.53
Negative emotion	4.04	1.36	4.02	1.10	.07	.02
Social process	6.02	2.16	5.07	1.78	2.29*	.48
Cognitive process	18.68	1.89	18.33	2.17	.84	.17
Insight	2.96	.83	2.86	1.10	.49	.10

Note. The mean denotes the percentage of a particular word category among the entire writing sample (e.g., 3.32% of the words were positive emotion words within the self-compassion condition writing samples).

* $p < .05$

Chapter 6: Discussion

This chapter will summarize and interpret the findings of the study within the context of the relevant literature. Limitations of the study, clinical implications, and future directions for research will be discussed. While this study explored eight main outcome variables, some of these outcomes may make a larger impact on participants' quality of life than others. For instance, participants' perception of pain, illness intrusiveness, and depression are particularly important outcomes to consider for chronic pain. Life satisfaction and positive and negative affect are more general outcome variables and less specific to chronic pain and therefore may make less of an impact on quality of life. Finally, pain willingness and activity engagement are specific to chronic pain and may be the mechanisms through which larger changes occur. Table 13 provides a summary of the findings for the main outcome variables.

Table 13. *Summary of significant and non-significant findings for main outcome variables*

Outcome Variables	Predictors					
	Main Effect for Time	Main Effect for Condition	Interaction b/t Time and Condition	Catastrophizing as Moderator	Changes in Self-Compassion	Changes in Self-Efficacy
Pain Willingness	No	No	No	No	No	Yes
Activity Engagement	No	No	No	Yes	Yes	Yes
Illness Intrusiveness	No	No	Yes	No	Yes	Yes
Pain Severity	Yes	No	No	No	No	Yes
Life Satisfaction	No	Yes	No	No	No	Yes
Depression	Yes*	No	No	No	Yes	Yes
PANAS –PA	Yes	No	No	--	--	--
PANAS –NA	No	No	No	--	--	--

Yes=significant findings; No=non-significant findings

Significance based on $p \leq .05$

*Trend: $p = .06$

Manipulation of the Writing Conditions

Several steps were taken to determine if the two writing conditions were carried out as intended. Surprisingly, none of the hypotheses regarding manipulation checks were robustly supported. There was no significant difference between writing conditions for scores on the self-compassion scale or the chronic pain self-efficacy scale. Moreover, an independent rater's judgment of group assignment based on essay content resulted in only moderate agreement with the correct assignment. While the rater categorized 73.7% of the essays correctly, this is below the percentage of similar manipulation checks from other expressive writing studies (e.g., 86.9%, Danoff-burg et al., 2006; 95.0%, Stanton et al., 2002). Finally, the hypotheses regarding differences between the two writing conditions in terms of pronoun use were not supported. The majority of research on the expressive writing paradigm does not report manipulation checks of the writing conditions, especially related to word usage between the two conditions. Therefore it is difficult to know how the results of the manipulation checks in this study compare to previous research.

Since hypotheses about differences in pronoun use between the self-compassion and self-efficacy conditions were not supported, we decided to explore other potential linguistic differences between the two writing conditions. Findings indicate that participants in the self-compassion condition used more social process words (e.g., they, child, mate, talk) in their writing than those in the self-efficacy condition. This aligns with the goals of self-compassion writing since participants were asked to think about what a friend would say to them in order to promote a more

interconnected view of the self. Moreover, participants in the self-compassion condition used more positive emotion words as compared to the self-efficacy condition. The self-compassion condition emphasized writing in a way that helped participants feel understood and accepting of their emotions, which would likely encourage the use of more positive words to describe their experiences. Therefore, although none of the hypothesized manipulation checks were robustly supported, differences in word usage does provide some evidence that participants approached the writing conditions in different ways.

One reason for the lack of differentiation between the two writing conditions may have been a result of the instructions. Both sets of instructions encouraged participants to write about their thoughts and feelings regarding their pain and to write about difficulties they have experienced because of their pain. While the interventions asked participants to write about these thoughts, feelings, and difficulties in different ways (the self-compassion condition emphasized acceptance and understanding, whereas the self-efficacy condition emphasized pain management strategies), these differences may not have been emphasized enough or participants may not have followed the instructions completely.

Most previous expressive writing studies have either compared traditional expressive writing to a control condition or compared two active writing interventions that were distinctly different (e.g., disclosure of a traumatic event vs. benefits of the traumatic event; Danoff-burg et al., 2006; Stanton et al., 2002). Few studies have compared two positive writing conditions. One study compared a self-compassion

writing intervention with an optimism writing intervention and did not find any differences between these two conditions in terms of outcome variables (Shapira & Mongrain, 2010). Although this previous study did not conduct manipulation checks, it is possible that positive writing interventions produce similar benefits. In our study, self-compassion scores significantly increased for both writing conditions, suggesting that both types of writing fostered a sense of self-acceptance and mindfulness. The self-efficacy writing condition encouraged participants to write about ways they have successfully managed their pain, which may have fostered a greater appreciation for their abilities and therefore enhanced their reported self-compassion. Moreover, participants in both the self-compassion and self-efficacy conditions used a relatively high percentage of cognitive process words (e.g., cause, know, ought; avg=18.68 and avg=18.33, respectively), suggesting that both types of conditions encouraged participants to explore and describe their thought processes.

Thus, self-compassion and self-efficacy writing may produce similar benefits, making it difficult to distinguish these two conditions. This is important to keep in mind when interpreting the results of the study. Despite the lack of differentiation between the two conditions, some differences in outcomes were found as discussed below.

Impact on Physical Well-being

This study explored whether participants in either the self-compassion or the self-efficacy condition would report improvements in their physical well-being after the intervention. Physical well-being was measured by the pain willingness and

activity engagement subscales of the Chronic Pain Acceptance Questionnaire, the Illness Intrusiveness Rating Scale, and average pain severity. Overall, the data indicated that reported illness intrusiveness decreased for the self-compassion condition and increased for the self-efficacy condition. This finding had a medium effect size based on a partial eta squared of .07, indicating a fairly strong interaction between writing condition and illness intrusiveness scores. Thus, the self-compassion condition appeared to benefit participants by reducing the reported daily interference caused by their chronic pain. Additional analyses supported this finding by showing that increases in self-compassion scores across the two writing conditions reduced reported illness intrusiveness. This is an important finding since less interference with activities of daily living can greatly improve health-related quality of life (Devins et al., 1983). Moreover, this finding corresponds with previous research that found interventions focused on support and expression of emotions, such as supportive-expressive group psychotherapy, significantly reduce illness intrusiveness for chronic diseases (Edworthy et al., 2003). The self-compassion condition is similar to these interventions in that it emphasized support by encouraging participants to think about what a friend would say to them and emphasized expression of emotions by being accepting of their distress.

Conversely, we found that participants in the self-efficacy condition reported experiencing greater illness intrusiveness after the intervention. The self-efficacy condition emphasized writing about ways to enhance confidence in dealing with pain and previous and future pain management strategies. It could be that this type of

writing caused participants to focus more on their pain experiences in a way that they found more intrusive to their daily life. Interestingly, additional analyses found that increases in self-efficacy scores across writing conditions predicted a decrease in reported illness intrusiveness. Therefore, it could be that the self-efficacy writing condition was not effective at increasing self-efficacy scores, but that when participants did report increases in their self-efficacy, regardless of writing condition, they were better able to manage their pain and reduce the reported intrusiveness of the pain in their life. The self-efficacy writing may have made at least some participants more aware that their strategies for managing pain were not very effective or were difficult to enact, thereby actually reducing their reported self-efficacy. One participant in the self-efficacy condition described, “I think I would have to say all the fun has gone and I am reduced to sitting or laying on the couch watching tv or reading. I walk when I can but not regularly as I should . Guess I have lost interest in helping myself.” This illustrates how some participants felt helpless to deal with their chronic pain and realized that they did not have very effective strategies to cope.

Participants in both writing conditions experienced a significant decrease in average reported pain severity. While this finding was statistically significant and had a medium effect size based on a partial eta squared of .07, the reductions in pain severity scores were not clinically significant for either group according to the guidelines presented by Kendrick and Strout (2005). Reductions in pain severity scores of 1.39 points (95% confidence interval=1.27-1.51) on the 11-point numeric rating scale are needed in order for the results to be clinically meaningful. The

reductions in average pain severity scores were .36 points for the self-compassion condition and .46 points for the self-efficacy condition. Additional analyses revealed that increases in reported self-efficacy across the two interventions significantly predicted lower reported pain severity, but that increasing self-compassion scores was not a significant predictor. Therefore, the reduction in reported pain severity may be less due to the type of writing condition and more due to whether the writing helped participants increase their self-efficacy scores. It also seems evident that the self-compassion condition helped some participants increase their self-efficacy scores even though this was not the intent of the intervention. For instance, participants in the self-compassion condition may have been more likely to use pain management techniques such as mindfulness, which may have increased their reported self-efficacy for coping with pain.

Previous research supports our findings in that a negative association has been found between pain severity and chronic pain self-efficacy (Arnstein, 2000; Hadjistavropoulos et al., 2007), whereas no significant association has been found between pain severity and self-compassion (Wren et al., 2011). Increasing self-efficacy scores likely reduces reported pain severity since individuals feel more capable of dealing with their pain and may have found effective pain management techniques which then produce the desired effect of reducing their reported pain. Our findings suggest that interventions that increase self-efficacy scores may be an effective way to reduce reported pain, however, a more intensive intervention (e.g.,

longer writing sessions, a greater number of writing sessions) may be needed in order to produce clinically meaningful reductions in pain severity scores.

Finally, our results indicate that pain willingness (i.e., the willingness to experience pain without attempts to control it) and activity engagement scores did not significantly improve after the intervention for either writing condition. This is surprising given that correlational studies have found positive associations between these two variables and self-compassion as well as self-efficacy (Costa & Pinto-Gouveia, 2011; Nicholas & Asghari, 2006). To this author's knowledge, previous research has not explored the effect of the expressive writing paradigm on pain willingness and activity engagement. However, when we analyzed changes in reported self-efficacy and self-compassion across both writing conditions, we found that increases in self-efficacy scores predicted higher activity engagement scores and higher pain willingness scores and that increases in self-compassion scores predicted higher activity engagement scores. This suggests that while the interventions may not have been completely effective at increasing reported self-compassion and self-efficacy, respectively, when participants did report experiencing these changes, they were able to report greater activity engagement. Moreover, reported self-efficacy appeared to be a particularly important factor in increasing pain willingness scores. Participants who reported an increase their self-efficacy were more willing to experience pain rather than try to control or avoid it.

Previous research has found that certain interventions were effective at enhancing pain willingness and activity engagement for chronic pain, however, these

treatments were more intense (e.g., longer duration) than the writing interventions used in this study and were specifically focused on pain acceptance (Hayes et al., 1999; McCracken et al., 2005; Vowles et al., 2011; Wetherell et al., 2011). For instance, acceptance and commitment therapy (ACT; Hayes et al., 1999) for chronic pain ranges from weekly group sessions over the course of eight weeks to eight hours per day for three to four weeks (McCracken et al., 2005; Vowles et al., 2011; Wetherell et al., 2011). This type of treatment focuses specifically on pain acceptance through goal-setting and engaging in activities despite pain. To our knowledge, research has not explored the effect of traditional expressive writing on pain acceptance. It could be that self-compassion and self-efficacy writing were too brief or not specific enough to produce main effects for pain acceptance scores. Moreover, these writing conditions were less intensive than ACT and did not focus specifically on pain willingness or activity engagement, as is done in ACT, which may be necessary in order to increase these aspects of pain acceptance. The results from the current study suggest that if the writing interventions can be modified to produce greater changes in reported self-compassion and self-efficacy that this could in turn increase pain acceptance scores.

Overall, it appears that the writing interventions were effective at enhancing reported physical well-being to the extent that they were able to produce changes in reported self-compassion and self-efficacy. When increases in self-compassion scores were evident, regardless of writing condition, this produced lower reported illness intrusiveness and higher reported activity engagement. However, increases in self-

efficacy scores appeared to be even more beneficial since it led not only to lower reported illness intrusiveness and higher reported activity engagement, but also higher pain willingness scores and lower pain severity scores. The best way to increase reported self-efficacy remains elusive and self-efficacy writing used in this study may not be an effective means to this end. For instance, the self-efficacy writing condition led to higher illness intrusiveness scores, whereas increases in reported self-efficacy led to lower illness intrusiveness scores. This suggests that the self-efficacy writing condition itself did not increase reported self-efficacy. However, there may be other aspects about the writing, regardless of condition, that fosters self-efficacy. Alternatively, the effects of the writing condition may have been minimized due to individual differences. Future research should explore potential moderators as well as mediators for self-efficacy writing.

Impact on Psychological Well-being

In addition to changes in physical well-being, this study also explored whether the self-compassion or the self-efficacy condition influenced changes in reported psychological well-being. Psychological well-being was measured by the Satisfaction with Life Scale and the Center for Epidemiological Studies - Depression Scale. The results indicate that participants in the self-efficacy condition reported higher life satisfaction on average than those in the self-compassion condition, however, there was no significant increase in life satisfaction scores for either condition. Thus, the difference in overall level of reported life satisfaction between the two conditions may be more due to pre-existing differences between the two groups. This finding

had a small-medium effect size based on a partial eta squared of .04. Although participants were randomly assigned to each condition, this does not guarantee that both groups are completely equivalent. Despite the differences between conditions, the average life satisfaction scores within both groups (self-compassion=12.93, self-efficacy=16.48) were lower than other chronic pain samples (e.g., average=23.0±8.5, Cohen et al., 2007). Given the low scores, a brief intervention may not be enough to raise life satisfaction in this sample.

Additional analyses did reveal that increases in self-efficacy scores produced significantly higher life satisfaction scores after the intervention. Thus, although the writing conditions did not produce higher reported life satisfaction in and of themselves, when participants did report an increase in their self-efficacy, they reported experiencing improvements in this area. This corresponds with previous research on self-efficacy for chronic pain. While self-efficacy writing intervention studies have not explored the impact of writing on life satisfaction, other types of interventions for enhancing self-efficacy have increased life satisfaction in chronic pain samples (LeFort, 2000; Mangels et al., 2009). One intervention involved a 6-week psycho-educational intervention to enhance the self-management of chronic pain and employed strategies to enhance self-efficacy throughout the program (Lefort, 2000). The other intervention involved nine 90-minute group sessions on pain coping strategies and also emphasized self-efficacy (Mangels et al., 2009). These interventions were much more intensive than the self-efficacy writing sessions used in this study and also actively taught pain management strategies. Therefore, a more

intensive intervention may be needed in order to actively enhance self-efficacy scores, thereby producing more widespread changes in reported life satisfaction for chronic pain populations.

Self-compassion intervention studies have not specifically explored the impact on life satisfaction, however these studies have found that writing about self-compassion increased happiness and the ability to self-soothe (Gilbert & Procter, 2006; Shapira & Mongrain, 2010). Therefore, self-compassion may have more of an influence on specific measures of well-being, such as happiness, as opposed to global measures of subjective well-being such as life satisfaction.

Our results indicate that reported depression symptoms did not significantly decrease after the intervention for either writing condition. However, the decrease in depression scores approached significance ($p=.06$) regardless of writing condition, suggesting that this finding may have been significant with a larger sample size and more power. This finding had a small to medium effect size as indicated by a partial eta squared of .04, supporting the notion that greater power would be needed to detect a significant difference. Additional analyses found that increases in reported self-compassion and self-efficacy, regardless of writing condition, led to significantly lower depression scores. According to the literature, a cut-off score of 12 or higher indicates depression on the short version of the CES-D used in this study (Cheng & Chan, 2005; Cole et al., 2004). Participants' CES-D scores in the self-compassion condition decreased from 13.3 to 12.8 and in the self-efficacy condition, the scores decreased from 13.1 to 11.7. Thus, although the decrease in depression scores for

each condition was not statistically significant, there was perhaps a clinically significant drop in depression for the self-efficacy writing.

In terms of previous research, one study employed a similar self-compassion writing intervention and found that it reduced depression in a general internet sample (Shapira & Mongrain, 2010). They had a slightly larger sample size (n=63 for the self-compassion condition; n=70 for the control condition) which may account for the difference in findings. Moreover, their study used a general internet sample and it may be more difficult to reduce depression symptoms in samples with chronic conditions, such as chronic pain. Researchers have found that chronic pain populations often have a high prevalence of clinical depression (18%-52%; Blair et al., 2003). Although the CES-D short-form used in this study does not have cut-offs for clinical depression, participants in our study did report higher depression symptoms (avg=11.24 - 13.00) as compared to the college student sample (avg=7.71) used to develop the CES-D short form (Cole et al., 2004). Therefore, chronic pain patients may require more intensive interventions in order to increase their reported self-efficacy and self-compassion, thereby reducing depression scores. In support of this notion, Gilbert and Proctor (2006) found that a more intensive self-compassion intervention involving 12 two-hour sessions of compassionate mind training reduced depression in a sample with chronic mental health difficulties.

As with the physical well-being outcomes, it appears that the writing interventions were effective at enhancing reported psychological well-being to the extent that they were able to produce changes in reported self-compassion and self-

efficacy. When increases in self-compassion scores were evident, regardless of writing condition, this produced lower depression scores. Yet, once again, increases in reported self-efficacy appeared to be even more beneficial since it led to both lower depression scores and higher life satisfaction scores. Changing reported self-efficacy may be particularly difficult in a chronic pain sample since their condition is chronic and they may feel that pain management is outside of their control. The participants who were able to increase their self-efficacy scores may have been in a better psychological state where they could more easily benefit from the writing intervention and therefore report experiencing higher psychological well-being. Future research should determine what aspects of the writing helped participants report increases in their self-efficacy and whether certain participants can increase their self-efficacy scores more readily than others.

Changes in Affect

This study explored whether participants reported changes in affect during the three writing sessions. Findings indicate that positive affect scores, but not negative affect scores, changed significantly across the writing sessions, regardless of condition. The changes in positive affect over time had a medium effect size as indicated by a partial eta squared of .05. As shown in Figure 6, reported positive affect increased directly after each writing session for both conditions, and this increase was significant for the second writing session. This is consistent with other studies that have employed positive writing interventions (Burton & King, 2004; King, 2001), including a study that utilized a self-efficacy writing intervention (Kirk

et al., 2011), which found that writing increased positive affect. However, the majority of expressive writing studies average the ratings of affect across writing sessions without assessing how affect may change over the course of the writing sessions (Burton & King, 2004; King & Miner, 2000; Kirk et al., 2011). We felt it was important to explore how reported affect may change not only during the writing session, but also in between writing sessions.

Results indicate that positive affect scores decreased during the week between writing sessions and this decrease was significant between the first and second writing sessions. Therefore, reported positive affect was significantly higher directly after the first writing session as compared to directly before the second writing sessions. Participants reported the highest level of positive affect following the first writing session, which could be due to the novelty of the task or the activating of hope. It is possible that participants reported the biggest drop in positive affect after that first writing session since the writing caused them to process their pain experiences more in depth during the week following the intervention. Interestingly, the second writing intervention seemed to be the most powerful in terms of increasing reported positive feelings. Participants may have found it particularly rewarding to follow-up on their reactions to the first writing session and process any thoughts or feelings that the first writing session triggered. Participants also didn't report as large of drop in positive affect in the week after the second writing session. It is important to note that participants reported a similar level of positive affect after the last writing session as compared to when they started the study. Since participants were asked to

write about the same topic for each session, it is possible that the writing would have less of an impact on positive emotions for each subsequent writing session if the intervention were to continue. Alternatively, participants may not have reported as much of an increase in positive affect during the last writing session in anticipation of the study ending. Much like termination during psychotherapy, participants may not have wanted to engage as deeply in the writing experience during the third session since they knew that this would be the last writing session. Most studies average affect ratings across writing sessions, therefore it remains unknown how these results compare to previous research. However, it is apparent that averaging ratings would potentially miss the large fluctuations in positive affect scores that occur, especially during the first two writing sessions. Moreover, the fluctuations in positive affect scores followed the same pattern for both the self-compassion and the self-efficacy writing conditions. Therefore, these reported changes in positive emotions may be similar for most active writing interventions, regardless of the condition.

In contrast to positive affect, there was no significant difference in reported negative affect during or between writing sessions for either condition. This is consistent with other positive writing studies (Burton & King, 2004; King & Miner, 2000), including a self-efficacy writing intervention (Kirk et al., 2011), which found that writing did not have an effect on negative affect. Brief self-compassion writing interventions also did not find any differences in terms of negative mood (Zabelina & Robinson, 2010). The traditional expressive writing paradigm has been found to increase negative affect as compared to the control condition, however, even with this

type of intervention negative affect remained consistent over the course of the writing sessions (Gillis et al., 2006). Thus, reported negative affect appears to be relatively stable and is more difficult to influence than positive affect.

Pain Catastrophizing as a Moderator

In order to determine whether some participants benefitted more from the two types of writing interventions than others, we explored reported pain catastrophizing as a potential moderator. Pain catastrophizing represents an important variable to study since it has been associated with numerous negative outcomes in chronic pain samples, including greater pain severity, higher pain intensity, greater negative affect, and reduced positive affect (Osman et al., 2000). Moreover, pain catastrophizing has been found to predict poor treatment outcomes for many different types of interventions, such as pharmacological (Mankovsky, Lynch, Clark, Sawynok, & Sullivan, in press), surgical (Sullivan, Tanzer, et al., 2009), physical (Wideman & Sullivan, 2011a) and psychological (Sullivan et al., 2005). The outcome variables we explored included pain willingness, activity engagement, pain severity, illness intrusiveness, life satisfaction, and depression symptoms. Pain catastrophizing was found to significantly moderate the relationship between writing condition and activities engagement, such that participants with high pain catastrophizing scores had higher activities engagement scores following the self-efficacy writing as compared to the self-compassion writing. This finding had a medium effect size. Reported pain catastrophizing was not a significant moderator for any of the other outcome variables.

It has been suggested that those high in pain catastrophizing benefit from acknowledging and processing negative emotions and helplessness regarding their pain (Norman et al., 2004; Sullivan & Neish, 1999), which would align more with the goals of the self-compassion condition. However, the self-efficacy condition may have been particularly effective at encouraging participants high in pain catastrophizing to re-evaluate the degree of threat they associate with their pain and their participation in activities (Moseley, 2004; Turk, 2004). Those high in reported pain catastrophizing are more likely to avoid activities since they magnify the amount of pain it may cause and feel helpless to deal with it (Sullivan, 2009; Vowles et al., 2008). The self-efficacy condition may have helped these participants realize that previous coping strategies have been effective, thereby increasing their reported confidence that they could manage their pain when engaging in activities. Moreover, this may have been more helpful in promoting reported activity engagement than the self-compassion condition since self-efficacy promotes a more active coping strategy. While previous research has not explored pain catastrophizing as a moderator on the relationship between interventions and activities engagement, studies have found that interventions for pain self-management reduced pain catastrophizing (Adams et al., 2007; Jensen, Turner, & Romano, 2001). Since the goal for the self-efficacy writing was to increase confidence in the self-management of pain, this intervention may have reduced the helplessness and rumination that those high in pain catastrophizing experienced.

Participants' Experiences in the Study

Expressive writing studies traditionally ask participants for their perceptions of the writing sessions in order to determine if participants were engaged in the task (Pennebaker & Beall, 1986). There was no difference between the self-compassion and the self-efficacy writing conditions in terms of how personal and emotional participants rated their essays or their ratings of how the writing affected their thoughts and feelings about their pain. This is not surprising since both conditions are positive writing interventions. We also explored how the subjective evaluations of participants in this study compared to the evaluations of participants in other expressive writing studies. Participants in this study tended to rate their essays as more personal (self-compassion: 6.1-6.2; self-efficacy: 6.1) as compared to participants in both traditional expressive writing interventions (4.9-5.8; Earnhardt et al., 2002; Pennebaker & Beall, 1986) and positive writing interventions (5.4-5.9; Cameron & Nicholls, 1998; Stanton et al., 2002). Moreover, participants in this study tended to rate their essays as more emotional (self-compassion: 5.8-6.0; self-efficacy: 5.5-5.9) as compared to both traditional (5.3-5.4; Earnhardt et al., 2002; Pennebaker & Beall, 1986) and positive writing interventions (5.5; Stanton et al., 2002). Thus, participants in our study reported a high level of engagement for both writing conditions, and self-compassion and self-efficacy writing may produce more personal and emotional essays than other types of writing interventions.

In addition, participants reported that they felt the intervention affected how they think about the writing topic (self-compassion: 4.3-4.7; self-efficacy: 4.6-4.7) to

a similar extent as other traditional (3.9; Earnhardt et al., 2002) and positive writing interventions (4.9-5.4; Cameron & Nicholls, 1998). Similarly, participants reported that they felt the intervention affected how they feel about the writing topic (self-compassion: 3.8-4.1; self-efficacy: 3.9-4.2) to a similar extent as other writing interventions (4.0; Earnhardt et al., 2002). Therefore, self-compassion and self-efficacy writing appear to affect participants' reported thoughts and feelings as much as other types of writing interventions.

Two additional subjective evaluation questions were asked in this study in order to determine the extent to which writing made participants report feeling understood and accepting of their pain and confident about managing their pain. Somewhat surprisingly, there was no difference between the self-compassion and the self-efficacy writing conditions for these two questions. Both conditions appeared to lead to a moderate level of feeling understood and accepting of their pain (self-compassion: 3.8-4.3; self-efficacy: 4.0-4.2) and a moderate level of feeling confident about managing their pain (self-compassion: 3.7-3.9; self-efficacy: 3.6-4.0). It could be that participants in the self-compassion condition were better able to manage their pain by being more accepting of the distress associated with their pain. Similarly, participants in the self-efficacy condition may have felt more understood and accepting of their pain after recounting their successful experiences coping with their pain. Thus, both conditions appear to lead to beneficial outcomes that go beyond the content they were asked to write about.

In addition to the subjective evaluation questions, which were asked after every writing session, participants were also asked follow-up questions at the end of the study about their experience. There was no significant difference between the two writing conditions in terms of how much participants reported that they had discussed their writing topics prior to the study or during the study. Participants reported that they had discussed their writing topics to a moderate extent prior to the study (self-compassion: 4.7; self-efficacy: 4.1), which is similar to what has been found in other studies (4.2; Earnhardt et al., 2002). Moreover, participants in both writing conditions reported that significant others in their life understood to a moderate extent what it was like for them to be in pain (self-compassion: 4.20; self-efficacy: 4.26).

Participants may have felt more prompted to discuss their writing topics during the intervention if they felt that others did not understand their experiences of pain. There was also no significant difference between the two writing conditions in terms of how helpful participants reported the writing sessions were or how likely they would be to do this type of writing on their own. Participants in both writing conditions appeared to find the writing moderately helpful (self-compassion: 4.56; self-efficacy: 4.65), which falls within the higher end of the range as compared to other expressive writing studies (3.5-5.0; Cameron & Nicholls, 1998; Stanton et al., 2002). Moreover, they reported that they were moderately likely to do self-compassion or self-efficacy writing on their own (self-compassion: 4.34; self-efficacy: 3.91), suggesting that this could be a practical and useful self-administered intervention strategy for individuals with chronic pain.

Overall, participants in both the self-compassion and self-efficacy conditions appeared to have a positive experience in the study. They reported that their essays were highly emotional and personal, reported that the writing moderately affected how they think and feel about their pain, and reported that the writing moderately increased their acceptance of pain and confidence about managing their pain. In general, they reported that they found the intervention to be moderately helpful and would be moderately likely to write on their own. For such a brief intervention, the writing seemed to have a substantial, positive impact on participants.

Limitations

This study has several limitations. The first group of limitations involves the sample and the recruitment strategy. Participants were recruited from multiple different chronic pain websites and forums making it impossible to calculate the response rate. In addition, the sample recruited for this study is likely not representative of all individuals suffering from chronic pain for several reasons. First, there was a sampling bias since participants were largely recruited from online forums. While online interventions have the potential to reach a wider pool of participants, it may also target those who tend to seek resources and support via the internet. In order to address this limitation, participants were also recruited from local chronic pain support groups. Second, the very nature of the intervention as an online exercise may have attracted those who feel more comfortable with online technology and may have restricted those with limited or no access to the internet. Therefore, this limits the generalizability of the results. Third, since participants were self-selecting

to participate in the study, as opposed to being referred by medical doctors, the presence of chronic pain was based on their perception. This subjectivity may have skewed the sample in that those who perceived themselves to have chronic pain participated in the study, whereas those who did not have this perception, regardless of a doctor's diagnosis, did not participate. However, the nature of pain is inherently subjective (Dworkin et al., 2005), which suggests that this method of self-selection may have been appropriate. We also recruited subjects from websites that catered to individuals with chronic pain (e.g., www.centralpain.org). Moreover, rigorous eligibility criteria were used to address this limitation by only including participants who had a high level of pain severity, experienced pain on most days, and had been diagnosed with chronic pain or a chronic pain condition or discussed pain management strategies with a doctor. These tend to be characteristics of chronic pain, therefore, we can be more certain that the sample used in this study truly did have chronic pain. Participants were also randomized to the treatment conditions which minimizes allocation bias and ensures that no systematic differences exist between the participants in each group.

The second group of limitations involves the naturalistic setting and the execution of the intervention. Since the intervention was conducted in a natural setting, as opposed to a laboratory environment, it was more difficult to control for extraneous variables and determine adherence to the treatment. In order to address this limitation, several steps were taken. Participants were asked to perform the writing task in a quiet, comfortable, and private setting. Time stamps for when

participants entered and exited the writing website were reviewed as a rough estimate of the amount of time spent writing. The findings indicate that most participants complied with the writing time. The writing samples were also reviewed and participants that did not spend much time on the writing (e.g., 4 minutes) or did not write anything meaningful (e.g., “nothing”) were excluded from the analysis. Moreover, participants were also emailed on the specific days that they were expected to complete the writing to ensure that the writing sessions occurred approximately a week apart. If there were more than two weeks in between writing sessions, these participants were also excluded from the analysis. These steps go beyond what most expressive writing studies report in terms of compliance checks (Frattaroli, 2006).

Another limitation of this study is the lack of robust differences between the two writing conditions. Two viable interventions were used for this study rather than a treatment condition and a neutral control condition since writing about trivial topics lacks face validity and risks creating a negative response (Norman et al., 2004). Moreover, it was anticipated that participants could benefit from both conditions, but perhaps in different ways. However, the findings indicate that the writing interventions did not produce the intended consequences in that both interventions increased self-compassion, but neither produced significant increases in self-efficacy. This could be because the writing instructions for the two conditions were too similar, causing participants to write in a similar way. Moreover, participants that did experience increases in self-compassion and self-efficacy had better outcomes, but this was irrespective of writing condition. Based on review of the writing content,

many of the participants seemed very preoccupied with their pain and getting medications or relief, which may have made it difficult for them to adhere to or focus on the intervention. Participants who were less preoccupied with their pain or in a better psychological state may have been more able to follow the intervention and therefore benefit from it. In addition, writing may not be the most effective means of increasing self-efficacy. Self-efficacy is an action-oriented concept and increasing self-efficacy may require practice of certain behaviors rather than just thinking or writing about it. Thus, participants who were able to increase their self-efficacy through writing may have already had the supports in place to persist at and succeed in their efforts. Even so, some differences were found between the two writing conditions in terms of content of the essays and effect on illness intrusiveness. If the two writing interventions were made more distinct, other differences in terms of outcomes may also emerge. This possibility will be explored more in the future directions section.

Finally, this study was limited by only using self-report measures, meaning that the results of this study are dependent upon participants' assessment of their own psychological and physical health. This is a limitation since self-reports tend to be only modestly related to real-world behaviors (Pennebaker 2004). Moreover, participants' self-reports may have been influenced by their current mood or how much pain they were experiencing in the moment. Therefore, participants may have over- or underestimated their physical and psychological well-being, thereby producing biased results. For instance, participants may not have been aware of subtle

changes, such as engaging in more activities, if they were distracted by their pain. In addition, this study has a mono-method bias where only using self-report measures may have restricted the full measurement of the constructs. For example, the Activity Engagement scale measures participants' perceptions of how much they are participating in activities, but it doesn't measure participants' actual behaviors. Ideas for how future studies could use different methods other than self-report to measure psychological and physical changes are discussed below.

Future Research

Based on the limitations of this study, one idea for future research is to make the self-compassion and self-efficacy writing conditions more distinct. Previous self-efficacy writing interventions have asked participants not only to write about personal mastery experiences, but to also write about vicarious mastery (e.g., observations of how another person managed the issue effectively), verbal encouragement (e.g., the encouragement they have received from others), and physiological states (e.g., how their emotional arousal contributed to their performance) (Fitzgerald & Schutte, 2010; Kirk et al., 2011). Moreover, instructions for these previous interventions gave examples of possible journal entries that might enhance self-esteem to make the instructions more concrete. Future studies could incorporate these additional aspects into self-efficacy writing for chronic pain which would strengthen the intervention and further differentiate it from the self-compassion writing. In addition, self-efficacy interventions may require more action-oriented techniques, beyond just writing.

Therefore, future interventions could have participants write their goals for pain management and develop a detailed plan that they could then carry out.

In this study, participants did not always comply with the writing instructions, as indicated by the 26.3% of the essays that were not correctly categorized by an independent rater. Future studies should consider ways to increase compliance with treatments, especially when introducing potentially novel constructs, such as self-compassion, or when dealing with “clinical” samples who might be preoccupied with pain. One way to assess for and increase compliance is to have participants take a simple quiz to determine if they understand the construct they are being asked to write about. For example, participants could read different statements (e.g., examples of what someone might write in a writing intervention) and rate the degree to which these statements demonstrate self-compassion. The more accurate participants are at identifying statements that reflect the construct, the more likely they will be to comply with the intervention. Alternatively, participants could state how they thought they were instructed to write. These additions could serve as a manipulation checks in future studies.

This study used life satisfaction as a global measure of subjective well-being. While increases in self-efficacy produced higher life satisfaction, increases in self-compassion did not. Future research should consider using more specific measures of psychological well-being that may be more directly influenced by expressive writing and by self-compassion. Previous studies using expressive writing with chronic pain samples have used health-related quality of life measures, such as the Flanagan

Quality of Life Scale (Burckhardt, Woods, Schultz, & Ziebarth, 1989), as an indicator of psychological well-being (Broderick et al., 2005). Future studies may consider exploring whether a self-compassion or self-efficacy writing intervention influences quality of life as it relates to chronic pain. However, quality of life may not be the same as psychological well-being. Often, expressive writing studies that use chronic health populations measure the negative side of psychological well-being, such as depression or anxiety. Yet, measuring the positive dimension of psychological well-being is important, especially since positive writing interventions may have particularly large influence in this area. Future writing studies could explore specific areas of positive psychological well-being through measures such as the Adult Hope Scale (Snyder et al., 1991) or the Meaning in Life Questionnaire (Steger, Frazier, Oishi, & Kaler, 2006). To this author's knowledge, these measures have not been used in expressive writing research.

In this study, the writing conditions were only effective to the extent that they increased self-compassion or self-efficacy. However, since there were no differences between the two conditions on these measures, it is difficult to know what aspects of the writing produced these changes. Pennebaker and other researchers have begun to analyze the word content of participants' writing samples to determine how writing achieves beneficial effects (Pennebaker & Graybeal, 2001). These studies have usually used the Linguistic Inquiry Word Count (LIWC; Pennebaker & Francis, 1999) computer program to create word categories. However, this system is unable to capture the meaning of the text and only offers a crude representation of the

linguistics used in the writing. Therefore, future studies could use qualitative methods, such as consensual qualitative research (Hill, Thompson, & Williams, 1997), to analyze the content of the writing samples to gain a deeper understanding of how participants use the writing intervention and determine if writing in a certain way or about certain topics is more beneficial. Preliminary evidence using word categories indicates that writing interventions cause cognitive changes and that those who increased their use of cognitive words (e.g., causal and insight words) over the writing sessions experienced greater improvements in health (Pennebaker, Mayne, & Francis, 1997). Qualitative analysis may be able to determine the steps by which this occurs and how cognitive changes could lead to better health.

It would be beneficial to determine not only what aspects of the writing increase self-efficacy and self-compassion, but also which participants were able to experience more of an increase in these areas than others. This study explored pain catastrophizing as a potential moderator, however, other personal characteristics and outside factors may be important determinants of who benefits more from expressive writing. For instance, it is unknown why certain participants in this study were able to experience more of an increase in self-efficacy and self-compassion, regardless of writing condition, than others. Future research should attempt to clarify the characteristics of individuals who benefit the most from expressive writing.

Similarly, future studies should also explore the role of employment in chronic pain samples. The majority of participants in this study were unemployed (62.4%), female (86%), and in their 40s and 50s (median age=51.0). Thus, the

unemployment rate in this sample is much higher than for the general U.S. population (26.0%) or for women in the 45-54 age range (24.3%) (U.S. Census Bureau, 2013). Chronic pain can reduce activity levels which in turn can limit an individual's ability to work (Institute of Medicine, 2011). A large body of research has found that work often provides individuals with a sense of meaning and purpose (e.g., Dik, Duffy, & Eldridge, 2009; Duffy, Allen, & Bott, 2012). Therefore, people with chronic pain who are unemployed may have more difficulty finding meaning in their lives, which could contribute to lower levels of psychological well-being. Moreover, research has found that working can help individuals cope with chronic pain by providing a means of distraction (Feuerstein, Sult, & Houle, 1985). Thus, individuals who are unemployed may actually experience more pain. Finally, unemployment could cause greater stress and financial concerns, especially given the high cost of health care for chronic conditions. Futures studies should explore how unemployment affects individuals with chronic pain and develop interventions that help people cope with the key stressors. For example, a writing intervention could be developed for an unemployed chronic pain sample that focuses on finding meaning in life. In addition, future studies should collect more information regarding the nature and extent of volunteering or being a student to determine how this may affect individuals with pain.

Finally, this study only used self-report measures to assess outcome variables. A meta-analysis of the expressive writing paradigm indicated that some studies also incorporate objective measures of behavior, such as health center records of the

number of doctor's visits (Frattaroli, 2006). Future research using the expressive writing paradigm with chronic pain patients should also consider using objective measures to assess changes in physical and psychological health. For instance, if future studies recruit participants from a chronic pain center, records of the number of visits to the center could be used. This would allow researchers to assess how the writing affects real-life behaviors. Pennebaker (2004) has also called for researchers to start collecting economically relevant information, such as absenteeism and medication use. This information could be collected by having the participants' employer or doctor complete measures regarding the number of missed work days or medication dose. In addition, spouses, caretakers, or other significant people in participants' lives could complete measures regarding the participants' behaviors and well-being. This multi-method approach would provide additional construct validity and reduce the bias and measurement error that could occur when only using self-report.

Clinical Implications

Evidence indicates that the participants in this study were experiencing levels of pain severity and pain catastrophizing that are characteristic of chronic pain populations. For instance, the average score for pain catastrophizing in this sample was 22.3 and scores of 20 or above are considered at moderate risk for developing chronic pain (Sullivan, 1995). The average level of pre-intervention pain severity in this sample was 5.9 and scores above 5 are considered to be moderate levels of pain (Serlin et al., 1995). Thus, the findings from this study that self-compassion and self-

efficacy writing benefitted participants in some ways (e.g., reducing pain severity and increasing self-compassion), suggest that it may also be beneficial for other individuals suffering from chronic pain. Moreover, participants that were able to increase their self-efficacy and self-compassion experienced wide-spread benefits in both physical and psychological health as a result. Additionally, most participants reported that they felt positively about the intervention, perceived it to be helpful, and would be willing to write on their own. A brief intervention that people can do on their own is appealing both logistically and financially.

Our results also indicate that the writing interventions may be particularly beneficial for certain types of individuals with chronic pain. For instance, the participants who were able to increase their self-efficacy and self-compassion the most, regardless of writing condition, also experienced the best outcomes in terms of psychological and physical health. We also found that the self-efficacy writing intervention was more effective at increasing self-reported participation in meaningful activities for those high in pain catastrophizing. This is important to note since the literature has called for the development of effective interventions for those high in pain catastrophizing, especially since this characteristic is traditionally associated with poor treatment outcomes (Sullivan, 2012). Increasing engagement in meaningful activities could be an important step for individuals high in pain catastrophizing since this could have a large impact on their quality of life. Pain catastrophizing is characterized by rumination, magnification and helplessness regarding pain experiences. Helping participants feel more capable of engaging in

activities may be the first step in building their self-efficacy and coping skills, which could then lead to even bigger positive changes in their lives. Although the intervention may be more effective for some people than for others, this could still be considered a meaningful intervention since chronic pain represents a debilitating condition.

The writing interventions used in this study demonstrated some beneficial effects for participants, however, given their brief nature, they would likely be most effective when combined with other types of treatments. For instance, while participants in this study experienced reductions in pain severity, these reductions were not clinically significant. However, if the writing intervention was combined with more intensive treatments, such as psychotherapy, support groups, or meditation, this could bolster the benefits that participants receive and lead to an even larger clinical impact. Future research could explore the additive effects of using a writing intervention in combination with treatment-as-usual. Moreover, the brief nature of the writing and participants' willingness to complete this intervention on their own make it particularly suitable for enhancing other treatments. Thus, for such a brief intervention, writing about self-compassion and self-efficacy appear to hold important clinical implications for individuals with chronic pain.

Conclusion

Overall, participants in both writing conditions reported a decrease in pain severity, an increase in self-compassion, and a marginal decrease in depression symptoms. While participants in both conditions experienced some benefits,

differences also emerged between the two groups. Participants in the self-compassion condition reported a decrease in illness intrusiveness, whereas those in the self-efficacy condition reported an increase in illness intrusiveness. Upon further investigation, it became apparent that the writing interventions were only effective to the extent that they increased self-efficacy and self-compassion. The more participants were able to increase their self-compassion, regardless of the writing condition, the more they experienced decreases in depression, decreases in illness intrusiveness and increases in activity engagement. Increasing self-efficacy led to even more positive effects for both psychological and physical health. The more participants were able to increase their self-efficacy, the more they reported decreases in depression, increases in life satisfaction, reductions in pain severity and illness intrusiveness, and increases in activity engagement and pain willingness. In other words, increasing self-efficacy led to positive changes on all outcome measures. The findings also suggest that personal characteristics may play a role in determining the effectiveness of the writing interventions. Participants high in pain catastrophizing reported that they participated more in meaningful activities only when they were assigned to the self-efficacy condition.

Overall, this study contributes to the literature by showing that even a brief intervention can have a beneficial effect on the way individuals perceive their chronic pain and its impact on their lives. Moreover, these findings provide evidence of the effectiveness of using self-compassion and self-efficacy as positive writing interventions. Future research should explore which participants are able to increase

their self-efficacy and self-compassion the most from the writing interventions. Moreover, modifications need to be made in order to make these interventions more distinct so as to maximize the strengths of each and increase their effectiveness. In addition, qualitatively analyzing the writing samples could provide information about the underlying mechanisms that make each intervention effective. This study demonstrates that self-compassion and self-efficacy writing could be useful for individuals suffering from chronic pain, could be easily incorporated as a self-directed intervention, and could lead to positive changes.

Appendices

Appendix A

Informed Consent

Purpose of the Study	<i>This research is being conducted by Kathryn Schaefer and Mary Ann Hoffman at the University of Maryland, College Park. We are inviting you to participate in this research project because you are at least 18 years of age and have chronic pain. The purpose of this research project is to explore the effects of writing about your pain.</i>
Procedures	<i>This is an online study which involves writing about your pain for 20 minutes, once a week for three consecutive weeks. You will be randomized to one of two writing conditions. You will be asked to complete measures about your pain and well-being prior to the writing and one week after the third time of writing. You will also be asked to complete a short survey directly before and after writing. In total, this study is anticipated to require 2 hours of your time. At the end of the study, you will receive a \$15 Amazon gift certificate. This study is funded by a University of Maryland grant and as a result you may be asked to provide your name, address and signature in order to receive the gift certificate.</i>
Potential Risks and Discomforts	<i>There may be some risks from participating in this research study. Writing about your chronic pain may induce feelings of discomfort or sadness. There will be no one monitoring your writing on a regular basis and there will be no one giving you feedback on your writing. If for any reason you feel you need to contact the researchers, you can do so at kschaefer@umd.edu. There is also the risk of inadvertent disclosure if you do not complete the intervention in a private location and someone oversees your responses.</i>
Potential Benefits	<i>There are no direct benefits to participation. However, possible benefits include feeling more understanding or better about your pain after writing about it. We hope that, in the future, other people might benefit from this study through improved understanding of chronic pain.</i>

Confidentiality	<p><i>Any potential loss of confidentiality will be minimized by storing data in a locked office and password protected computer. Moreover, your identifying information will not be linked to your survey or written responses. Only members of the research team will have access to your responses.</i></p> <p><i>If we write a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.</i></p>
Medical Treatment	<p><i>The University of Maryland does not provide any medical, hospitalization or other insurance for participants in this research study, nor will the University of Maryland provide any medical treatment or compensation for any injury sustained as a result of participation in this research study, except as required by law.</i></p>
Right to Withdraw and Questions	<p><i>Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. However, the \$15 gift certificate will be provided only on full completion of the study.</i></p> <p><i>If you decide to stop taking part in the study, if you have questions, concerns, or complaints, or if you need to report an injury related to the research, please contact the investigator, Kathryn Schaefer, at: 3214 Benjamin Building, University of Maryland, College Park, MD 20742, 507-382-3239, kschaefer@umd.edu.</i></p>
Participant Rights	<p><i>If you have questions about your rights as a research participant or wish to report a research-related injury, please contact:</i></p> <p style="text-align: center;"> University of Maryland College Park Institutional Review Board Office 1204 Marie Mount College Park, Maryland, 20742 E-mail: irb@umd.edu </p>

	<p>Telephone: 301-405-0678</p> <p><i>This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.</i></p>
Statement of Consent	<p><i>By clicking on the “next” button, this indicates that you are at least 18 years of age; you are able to read and write in English; you have chronic pain; you have read this consent form or have had it read to you; your questions have been answered to your satisfaction and you voluntarily agree to participate in this research study. You may print a copy of this consent form.</i></p> <p><i>If you agree to participate, please click “next”.</i></p>

Appendix B

Eligibility Criteria

1. Are you at least 18 years old? **Yes No**
2. Are you able to read and write in English? **Yes No**
3. Have you experienced pain on most days of the month for at least six months?
Yes No
4. Is your pain directly caused by a terminal condition (e.g., stage 4 cancer)? **Yes No**
5. Which of the following apply to you (choose all that apply)?
 - a. I have been diagnosed with chronic pain (i.e. pain lasting 6 months or longer)
 - b. I have been diagnosed with a condition associated with long-term or chronic pain
 - c. I have been prescribed medication to help me manage my pain
 - d. My doctor has discussed methods of pain management with me
 - e. None of the above
6. Please rate your pain by choosing the number that best describes your pain at its worst in the past 6 months.

0	1	2	3	4	5	6	7	8	9	10
No pain										Pain as bad as you can imagine
7. How did you learn about this study?

If participants are ineligible

Thank you for your interest in this study. In order to participate in this study, it is important to meet specific inclusion criteria. Due to these conditions, we regret to inform you that we cannot take you as a participant at this time.

Appendix C

Demographics

1. What is your country of residence? _____

2. What is your sex? M F

3. What is your age? _____

4. What is your racial/ethnic background? (Mark all that apply)

_____ African-American/Black

_____ Asian-American/Pacific Islander

_____ Asian-Indian/Pakistani

_____ Biracial/Multiracial

_____ Hispanic/Latino(a)

_____ Middle Eastern/Arab

_____ Native American/Native Alaskan

_____ White/European American

_____ Foreign National (please specify): _____

_____ Other (please specify): _____

5. What is your highest level of education completed?

_____ Grade school

_____ College

_____ High School

_____ Graduate School

_____ Other

6. What is your employment status?

Not employed _____

Employed part-time _____

Employed full-time _____

Student _____

7. What is your annual household income (before taxes)?

_____ Less than 30,000

_____ 30,000-59,999,

_____ 60,000-99,999

_____ 100,000-149,999

_____ 150,000 or higher

8. What is your relationship status?

- ☐ Married
☐ Divorced
☐ Widowed
☐ In a relationship with partner of ____ years
☐ Single

9. What is the source of your chronic pain? _____

10. On what part(s) of your body do you feel pain? _____

11. How long have you experienced pain ?

- ☐ Less than 6 months
☐ 6 months - 1 year
☐ 1 – 3 years
☐ 4 – 8 years
☐ 9 – 15 years
☐ 15+ years

12. What treatment are you currently receiving for your pain (choose all that apply)?

☐ Medication – list medications including over the counter

- ☐ Psychotherapy
☐ Biofeedback
☐ Acupuncture
☐ Chiropractic
☐ Support group
☐ Electrical stimulation
☐ Exercise/Physical therapy
☐ Hypnosis
☐ Other, please specify: _____

13. Please rate your pain by choosing the number that best describes your pain at its least in the past 6 months.

0	1	2	3	4	5	6	7	8	9	10
No pain										Pain as bad as you can imagine

14. Please rate your pain by choosing the number that best describes your pain on the average in the past 6 months.

0	1	2	3	4	5	6	7	8	9	10
No pain										Pain as bad as you can imagine

15. Please rate your pain by choosing the number that tells how much pain you have right now.

0	1	2	3	4	5	6	7	8	9	10
No pain									Pain as bad as	
									you can imagine	

Appendix D

Illness Intrusiveness Ratings Scale (Devins et al., 1983)

The following items ask about how much your illness and/or its treatment interfere with different aspects of your life. PLEASE CHOOSE THE ONE NUMBER THAT BEST DESCRIBES YOUR CURRENT LIFE SITUATION. If an item is not applicable, please choose the number one (1) to indicate that this aspect of your life is not affected very much. Please do not leave any item unanswered. Thank you.

How much does your illness and/or its treatment interfere with your:

Not Very Much	1	2	3	4	5	6	7	Very Much
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1. Health
2. Diet (i.e., the things you eat and drink)
3. Work
4. Active recreation (e.g., sports)
5. Passive recreation (e.g., reading, listening to music)
6. Financial situation
7. Relationship with your spouse, partner, or significant other
8. Family relations
9. Other social relations
10. Self-expression/self-improvement
11. Religious expression
12. Community and civic involvement

Total score: sum items, range = 13 to 91.

or

The mean for three subscales (range=1-7):

Relationships and personal development (items 5, 9, 10, 11, 12, 13)

Intimacy (items 7, 8)

Instrumental (items 1, 2, 4, 6)

Appendix E

Chronic Pain Acceptance Questionnaire–8 (CPAQ-8; Fish et al., 2010)

Directions: Below you will find a list of statements. Please rate the truth of each statement as it applies to you by choosing a number. Use the following rating scale to make your choices. For instance, if you believe a statement is “Always True”, you would choose the 6 next to that statement.

- 0=Never true
- 1= Very rarely true
- 2=Seldom true
- 3=Sometimes true
- 4=Often true
- 5=Almost always true
- 6=Always true

1. I am getting on with the business of living no matter what my level of pain is
2. Keeping my pain level under control takes first priority whenever I am doing something
3. Although things have changed, I am living a normal life despite my chronic pain
4. Before I can make any serious plans, I have to get some control over my pain
5. I lead a full life even though I have chronic pain
6. When my pain increases, I can still take care of my responsibilities
7. I avoid putting myself in situations where my pain might increase
8. My worries and fears about what pain will do to me are true

Pain willingness scale = Items 2, 4, 7 and 8 (reverse scored)

Activity engagement scale = Items 1, 3, 5 and 6

Total = activity engagement + pain willingness.

Appendix F

Self-Compassion Scale – Short Form (SCS-SF; Raes et al., 2011)

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

Almost never					Almost always
1	2	3	4	5	

1. When I fail at something important to me I become consumed by feelings of inadequacy.
2. I try to be understanding and patient towards those aspects of my personality I don't like.
3. When something painful happens I try to take a balanced view of the situation.
4. When I'm feeling down, I tend to feel like most other people are probably happier than I am.
5. I try to see my failings as part of the human condition.
6. When I'm going through a very hard time, I give myself the caring and tenderness I need.
7. When something upsets me I try to keep my emotions in balance.
8. When I fail at something that's important to me, I tend to feel alone in my failure
9. When I'm feeling down I tend to obsess and fixate on everything that's wrong
10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.
11. I'm disapproving and judgmental about my own flaws and inadequacies.
12. I'm intolerant and impatient towards those aspects of my personality I don't like.

Coding Key:

Self-Kindness Items: 2, 6

Self-Judgment Items: 11, 12

Common Humanity Items: 5, 10

Isolation Items: 4, 8

Mindfulness Items: 3, 7

Over-identified Items: 1, 9

Appendix G

Center for Epidemiological Studies-Depression Short Form (Cole et al., 2004)

Please indicate how often you have felt this way during the past week by using the following numbers:

- 1 = rarely or none of the time (less than one day)
- 2 = some of the time (1-2 days)
- 3 = occasionally or a moderate amount (3-4 days)
- 4 = most or all of the time (5-7 days)

1. I was bothered by things that usually don't bother me.
2. I felt that I could not shake off the blues even with the help from my friends or family.
3. I felt that I was just as good as other people.
4. I had trouble keeping my mind on what I was doing.
5. I felt that everything I did was an effort.
6. I felt hopeful about the future.
7. I felt my life had been a failure.
8. I felt fearful.
9. I felt lonely.
10. People were unfriendly.

The Rasch-derived CES-D comprises 10 items, 2 of which are reverse scored (item 3 and 6). Item ratings range from 0 to 3 and can be summed to create a simple total score. The possible range of total scores is from 0 to 30 with higher scores reflecting greater distress.

Appendix H

Satisfaction with Life Scale

Directions: Below are five statements that you may agree or disagree with. Using the 1 - 7 scale below, indicate your agreement with each item by choosing the appropriate number next to that item. Please be open and honest in your responding.

- 7 - Strongly agree
- 6 - Agree
- 5 - Slightly agree
- 4 - Neither agree nor disagree
- 3 - Slightly disagree
- 2 - Disagree
- 1 - Strongly disagree

_____ In most ways my life is close to my ideal.

_____ The conditions of my life are excellent.

_____ I am satisfied with my life.

_____ So far I have gotten the important things I want in life.

_____ If I could live my life over, I would change almost nothing.

- 31 - 35 Extremely satisfied
- 26 - 30 Satisfied
- 21 - 25 Slightly satisfied
- 20 Neutral
- 15 - 19 Slightly dissatisfied
- 10 - 14 Dissatisfied
- 5 - 9 Extremely dissatisfied

Appendix I

Positive and Negative Affect Schedule – Short Form (Short PANAS; Kercher, 1992)

Directions: This scale consists of a number of words that describe different feelings and emotions. Read each item and then choose the appropriate answer next to that word. Indicate to what extent you feel this way right now.

Use the following scale to record your answers.

(1) = Very slightly or not at all (2) = A little (3) = Moderately (4) = Quite a bit (5) = Extremely

1. Inspired
2. Afraid
3. Alert
4. Upset
5. Excited
6. Nervous
7. Enthusiastic
8. Scared
9. Determined
10. Distressed

Appendix J

Pain Catastrophizing Scale

- 0 – Not at all
- 1 – To a slight degree
- 2 – To a moderate degree
- 3 – To a great degree
- 4 – All the time

When I'm in pain...

1. I worry all the time about whether the pain will end.
2. I feel I can't go on.
3. It's terrible and I think it's never going to get any better.
4. It's awful and I feel that it overwhelms me.
5. I feel I can't stand it anymore.
6. I become afraid that the pain will get worse.
7. I keep thinking of other painful experiences.
8. I anxiously want the pain to go away.
9. I can't seem to keep it out of my mind.
10. I keep thinking about how much it hurts.
11. I keep thinking about how badly I want the pain to stop.
12. There's nothing I can do to reduce the intensity of the pain.
13. I wonder whether something serious may happen.

Appendix K

Chronic Pain Self-Efficacy Scale (Anderson, 1995)

1	2	3	4	5	6	7	8	9	10
very uncertain					very certain				

Self-efficacy for pain management (PSE)

1. How certain are you that you can decrease your pain quite a bit?
2. How certain are you that you can continue most of your daily activities?
3. How certain are you that you can keep your pain from interfering with your sleep?
4. How certain are you that you can make a small-to-moderate reduction in your pain by using methods other than taking extra medications?
5. How certain are you that you can make a large reduction in your pain by using methods other than taking extra medications?

Self-efficacy for physical function (FSE)

1. How certain are you that you can walk 1/2 mile on flat ground?
2. How certain are you that you can lift a 10 pound box?
3. How certain are you that you can perform a daily home exercise program?
4. How certain are you that you can perform your household chores?
5. How certain are you that you can shop for groceries or clothes?
6. How certain are you that you can engage in social activities?
7. How certain are you that you can engage in hobbies or recreational activities?
8. How certain are you that you can engage in family activities?
9. How certain are you that you can perform the work or school duties you had prior to the onset of chronic pain? (For homemakers, please consider your household activities as your work duties.)

Self-efficacy for coping with symptoms (CSE)

1. How certain are you that you can control your fatigue?
2. How certain are you that you can regulate your activity so as to be active without aggravating your physical symptoms (e.g., fatigue, pain)?
3. How certain are you that you can do something to help yourself feel better if you are feeling blue?
4. As compared to other people with chronic medical problems like yours, how certain are you that you can manage your pain during your daily activities?
5. How certain are you that you can manage your physical symptoms so that you can do the things you enjoy doing?
6. How certain are you that you can deal with the frustration of chronic medical problems?
7. How certain are you that you can cope with mild to moderate pain?
8. How certain are you that you can cope with severe pain?

Appendix L

Subjective Evaluation of Writing Task

1 2 3 4 5 6 7
Not at All A great deal

1. How personal were your essays?
2. To what degree did you reveal your emotions in your essays?
3. Do you believe that writing about this topic has affected how you think about this topic?
4. Do you believe facing this topic in your writing has improved the way you feel about it?
5. To what degree did writing about this topic make you feel understood and more accepting of your pain?
6. To what degree did writing about this topic make you feel more confident about managing your pain?

Appendix M

Follow-up Questions

1. Prior to this study, to what extent had you discussed some of the things you wrote about?

1 2 3 4 5 6 7
Not at All A great deal

2. Between writing sessions, to what extent did you discuss some of the things you wrote about with others?

1 2 3 4 5 6 7
Not at All A great deal

3. To what extent do significant others in your life understand what it is like for you to be in pain?

1 2 3 4 5 6 7
Not at All A great deal

4. How helpful did you find the writing sessions?

1 2 3 4 5 6 7

Not at AllA great deal

5. How likely would you be to do this type of writing on your own?

1 2 3 4 5 6 7
Not at all likely Very likely

Appendix N

Online Chronic Pain Study

Have you been experiencing pain that isn't directly caused by a terminal condition (e.g., stage 4 cancer)? Has the pain occurred on most days of the month for at least six months? Are you at least 18 years of age? If you answered "yes" to all questions, you may be eligible to participate in a study conducted by researchers at University of Maryland. The study explores participants' experiences with pain through 2 brief surveys and 3 writing exercises. Some people find writing as a way to record what happens to them or as a way to talk about difficult experiences. Structured writing interventions have been used in recent years to understand experiences of trauma, distress and other difficult experiences. This is your chance to help others in pain and help teach researchers how to better treat chronic pain.

The 2 surveys and 3 writing exercises will be spaced out so that you complete one per week for five weeks. It will take approximately 20-25 minutes of your time each week. You can complete the entire study online and at the end you will receive a \$15 Amazon gift certificate. This research is being conducted by Kathryn Schaefer, M.A., doctoral candidate and Mary Ann Hoffman, Ph.D, professor and co-director of the counseling psychology program at the University of Maryland, College Park.

If you would like to participate in this research, please contact Kathryn Schaefer at kschaefer@umd.edu.

If you would like more information about the study, it is listed on [ClinicalTrials.gov](https://clinicaltrials.gov) under the identifier NCT01639196. You can also go to the following link:
<http://clinicaltrials.gov/ct2/show/NCT01639196?term=NCT01639196&rank=1>

Thank you!

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Appendix O

Debriefing Form

General Aim and Purpose

Thank you for participating in this study. Brief writing interventions have been shown to help people understand difficult experiences. The purpose of this study was to look at the impact of two writing interventions that may change how people view and feel about their pain.

Writing Interventions

Participants were randomly assigned to one of two writing interventions: the self-efficacy writing intervention or the self-compassion writing intervention. The self-efficacy intervention required participants to write about their experiences with pain and their confidence in dealing with their pain. The self-compassion intervention required participants to write about their pain in a way that helped them feel understood and accepting of their pain.

Main Hypotheses

We think that those in the self-efficacy intervention will feel more confident about how they manage their pain and the consequences of it after the three writing sessions. Conversely, we think that those in the self-compassion intervention will be more accepting of the emotions around their pain and more understanding of how it affects their life after the three writing sessions.

Deception

It is important to note that no deception was used in this study.

Opportunity to take the other condition

If you would like to take the other writing intervention, go to the following link:
[link]

Contact Information and Therapy Services

Thank you again for your participation in this study. If you are ever concerned about personal issues, you can contact locate a therapist at the Psychology Today website: <http://therapists.psychologytoday.com/rms/>. In addition, if you are interested in finding out more information about writing exercises, you can find more information at: <http://homepage.psy.utexas.edu/homepage/faculty/pennebaker/pennebaker.html>. If you are interested in finding out more about self-compassion, you can find more information at: <http://www.self-compassion.org/>

If you have any questions about this research, please feel free to contact Kathryn Schaefer at kschaefer@umd.edu.

Appendix P

Writing Intervention Instructions

General Writing Intervention Instructions

You have been randomly assigned to one of two types of writing exercises. Please write for 20 minutes in a quiet, comfortable and private spot. Do not worry about grammar, spelling, or style. Don't worry about deleting. The only rule is that once you begin writing, please continue to write until the 20 minutes has passed. If you run out of things to say, just repeat what you have already written. Your writing will be kept confidential and only members of the research team will review the writing. Please note that no one on the research team will be reading your writing on a regular basis. If for any reason you feel you need to contact the researchers, please do so at kschaeffe@umd.edu.

[For second and third writing sessions] Even though the directions are the same as your previous writing session, we know that you may have thought of other things that you might want to include. You can write in a way that builds upon your previous writing sessions.

Self Compassion Instructions

For the three writing sessions, we would like you to write about your experience with chronic pain from a self-compassionate perspective. Self-compassion means to be kind to yourself and to be less self-critical or self-blaming. Try to have understanding for any distress you might be feeling and realize that your distress makes sense. Think about what you would say to a friend in your position, or what a friend would say to you about your experiences with pain. We would like you to write whatever comes to you, but make sure that the writing provides you with what you need in order to feel understood and not alone in your experiences with pain. You might write about how pain has affected your life, problems you have experienced because of your pain, and your feelings about those experiences. We realize that individuals with chronic pain experience a full range of emotions and we want you write from the perspective of someone who is accepting of these emotions. You can write about different pain experiences each time or similar accounts for all three writing sessions.

Self-Efficacy Instructions

For the three writing sessions, we would like you to write about your experience with chronic pain from a self-efficacy perspective. Self-efficacy means to be confident that you can perform certain actions in order to get to a desired outcome. Think about what you've learned about your chronic pain experiences and how you've handled these experiences in the past. Think about your confidence in dealing with your pain and ways that you could enhance your confidence in your ability to deal with your pain. We would like you to write whatever comes to you, but make sure that the writing provides you with a space to express your thoughts and feelings about your ability to manage your pain. You might write about what helps you cope with your pain, difficulties you have faced because of your pain and how you dealt with those difficulties, and what pain management strategies you plan to try in the future. We realize that individuals with chronic pain use a wide variety of coping mechanisms to deal with their pain and we want you to write about the strategies you think would work for you. You can write different accounts of your pain experiences each time or similar accounts for all three writing sessions.

Appendix Q

Reminder Email to Participants

Hello There,

You recently received an email to complete part ____ of the study. It is important that you complete this part of the study as soon as possible so that the study remains consistent. Remember that receiving the \$15 Amazon gift card is dependent upon completing the writing within the specified time frame. I appreciate your participation in my study!

Best,

Kathryn Schaefer, M.A. and Mary Ann Hoffman, Ph.D.

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